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Original Contributions.

COCAIN ANESTHESIA.

By R. J. Coultas, M.D., Mattoon, Ill. Read Before Eastern Illinois Dental Society, March 16, 1897.

Surgeons have always been interested in remedies which partially or totally relieve pain incident upon operations. The great advance along this line was the introduction of ether and chloroform. Previous to this rapidity and dexterity in operation were the means used to lessen suffering. However, in short operations and those where the aid of patient is desired, general anesthesia has its disadvantages. Nitrous oxid was popular some time ago, but is seldom used now, except for very short operations.

During the year 1884 Dr. Karl Koller first employed cocain as a local anesthetic in eye surgery, and since that time total anesthesia has been confined to exceptional cases. The same holds true as regards operations on the nose and throat; in fact, is true in the case of all mucous surfaces, when minor operations are to be performed. One great advantage partial anesthesia has over general is, that you have the conscious and intelligent assistance of the patient. In nasal treatment it is much more difficult to remove a spur from the septum or a hypertrophy from the posterior turbinated with the patient in a horizontal position than when sitting upright. I should judge the same would apply to dental surgery. Furthermore, cocain can be applied and anesthesia produced without giving the appearance of an operation, which is not possible in total anesthesia.

Cocain hydrochlorate comes in the form of crystals, which should be in their primitive form, clean and large; large crystals are better than small ones. Always avoid powdered cocain, as it is usually adulterated. The solution should be about 2 or 3 per cent, made with distilled or freshly boiled water, so as to keep it free from germs, which develop rapidly in a solution of cocain, rendering it

inert. There is a rather prevalent custom of making the solution antiseptic with some of the stronger germicides, which is objectionable. In cases where the vitality is weak and nutrition poor, on injecting a solution of this character you will find that a sloughing of the soft tissues often follows, and if sufficiently extensive may produce necrosis. So, while the germicide has proved an escharotic, cocain receives the odium.

When cocain was first used as a local anesthetic the solution was made too strong, usually a 10 or 20 per cent one being applied topically or injected hypodermically. If a patient be unusually susceptible to the poisonous effects of the drug he is quickly in an alarming condition. On the other hand, if a 2 per cent solution be employed the symptoms of poisoning manifest themselves slowly and there is ample time to save the patient from discomfort and yourself from embarrassment. The first symptoms of acute cocain poisoning are rapid and apparently difficult breathing, perspiration, and an anxious expression of face. Should the administration be continued, numbness of extremities and weak pulse follow, and patient may become unconscious.

I advocate the topical application of cocain to the mucous membrane before injecting it into the membranous tissue, as you then are forewarned in case of any idiosyncrasy, and the pain of injection is avoided. The effect of the topical application to mucous surfaces is first a pallor and shrinking of membrane, and then a lessening of sensation. The same condition obtains when cocain is injected into the deeper tissues. The anesthesia lasts about fifteen minutes and the tissues then return to their normal condition. In some cases where a 10 to 20 per cent solution is used a reaction takes place, and if repeated frequently the mucous membrane becomes thickened and chronically inflamed. It is claimed on good authority that cocain has no anesthetic effect on sensitive dentin, but it can be used to good advantage in treating the pulp cavity.

In 1896 a new local anesthetic was discovered—eucain. Chemically, cocain and eucain are very much alike, but the latter is more stable, does not become inert with age, and can be kept in solution without deterioration. Physiologically, they differ somewhat, as eucain does not produce anemia, does not dilate the pupil or disturb the accommodation of the eye, is said not to be so poisonous, and is readily borne where cocain cannot be used. I have used eucain in

nasal surgery and prefer it to cocain for removing hypertrophies from the turbinated bodies with the snare. As it does not shrink the tissues there is a larger mass to hold the wire in position. For an operation requiring more time and accompanied by hemorrhage cocain is preferable, because of its hemostatic properties. With due caution in their use, cocain and eucain are among our most useful drugs.

REMINISCENCES OF PRACTICE, A COMMENT THEREON.

By William H. Trueman, D.D.S., Philadelphia.

The leading paper in the April number of the Digest I have read with the keen interest it so well merits. We, the younger members of the profession, appreciate, I am sure, such scraps of history which our elder brethren are so well able to furnish. Many facts in our profession's history are found nowhere else than in recorded experiences, such as Dr. Tenison's paper is. In a few points, however, it is unwittingly misleading. The errors are such as are commonly made, due no doubt to our profession having neglected to provide such facilities as other professions have for its members becoming acquainted with its history and literature. For the benefit of those who may not have at hand the necessary data, I beg leave to suggest the following.

I take the time referred to by Dr. Tenison to be the early sixties. The large vulcanizers were supplanted by smaller ones at an early date. The Whitney, in size and shape identical with those now in use, and the Hayes oven, a very small affair, much the shape and but little larger than an ordinary vulcanizer flask, are advertised in the dental journals as early as March, 1861. The large, cumbersome ones Dr. Tenison speaks of had a very short reign and were quickly supplanted by those of more convenient size and shape.

In reference to dental literature, a little work—Zene Arzney, printed by Peter Jordan, at Meinz, 1532—in German, on the importance and care of the teeth, evidently compiled by a layman for popular reading, gives evidence that our science then existed; it speaks of obliterating superficial caries by the file, and directs that when the cavity is too deep to be thus disposed of, the decayed matter should be removed and the cavity filled with gold leaf. The earliest work of real scientific merit that has come down to us is one written upon dental histology by Eus-

tachius, a teacher of anatomy at the medical school of Padua, and dated 1563. This was followed in 1582 by Hemards' work, covering the practice of dental surgery, published at Lyons, then an important educational center. These two works may justly be considered the beginning of our strictly professional literature. Systematic dental education probably originated in France, and dates back to the time of Paré, for it was there, and through the influence of that most remarkable man, that our profession received its first educational uplift. The dentist there received his technical education in company with the surgeon and the Medécin; incompetents were suppressed, and the right to practice all avocations intimately associated with health and personal comfort was early made subject to wise and just laws—Statuts et Regiemens pour les Chirurgiens, etc., Paris, 1735. Peter Fauchard, a surgeon dentist of Paris, in 1728 published his excellent and comprehensive text-book upon dental science, the first that covered satisfactorily the whole ground. Mouton in 1746 gave us the first treatise upon prosthetic dentistry; and Jourdain in 1778 the first work exclusively upon oral surgery. The works of these distinguished writers, together with those of Lecluse, Bourdet, Laforgue, Ricci, Gariot, Delabarre, Audibran and many others, give ample evidence of the worthy position our profession had reached in France during the 18th century.

In Great Britain dental education closely followed the French idea, beginning in 1799, when Joseph Fox was appointed lecturer upon the structure and diseases of the teeth at Guy's Hospital, and with such modifications as experience has suggested it follows the same line to-day. It has given us Bell, Saunders, Nasmyth, Waite, Robertson, Cartwright, Tomes, and many other worthy men, some more closely associated with the science than the practice of dentistry.

With us, from some cause, the medical and the dental profession failed to harmonize as they had done in France and England, and it was only after a long and bitter controversy that our friends in Baltimore embarked in the new enterprise. I am impressed that the representatives of our profession, in their wisdom, required more accommodation for their prospective students than the medical colleges were willing to give; and so, determined to compromise nothing which in their judgment was essential to a thorough dental education, they were compelled to go it alone. Having had personal intercourse with some of the fathers who took part in

that matter, and heard from them their side of the story, I am convinced that they reluctantly did the only thing that they could do at that time to give the dental profession the much needed educational advantages. The medical colleges absolutely refused opportunity for practical instruction in the clinic and laboratory; this the fathers considered essential, and there it ended. In 1839 the first dental college was organized at Baltimore, and a desperate hard struggle it had. Students were few in number, expenses were heavy, and it was pestered, just as dental colleges are now pestered, by those possessing in an eminent degree that pernicious combination, a ready tongue and a plethora of impracticable notions. Had it not been for the liberality of its friends, who for several years contributed a handsome sum yearly, and the self-sacrificing devotion of its faculty, it would surely have failed. This was followed by the Ohio Dental College at Cincinnati in 1845; the Philadelphia College of Dental Surgery in 1850, which in 1856 became the Pennsylvania College of Dental Surgery; the New York College of Dental Surgery at Syracuse in 1852, a most promising enterprise, which through an unfortunate fire came to an end in 1855; the Philadelphia Dental College in 1863; and the New York Dental College in 1866. Since then they have multiplied rapidly.

At the time Dr. Tenison commenced practice the first national association had a few years before given up the ghost, done to death by dogmatism and discourtesy, and the present American Association was just struggling into existence. Unfortunately it seems to have inherited its predecessor's disorders and has grown prematurely old. So long as the congenital disease exists, there is little to be hoped for from the contemplated transfusion of warm Southern blood. There were then published some twenty or thirty dental journals, and strong and vigorous dental societies existed all over the land. There was, as he says, a great deal of poor work done; there was also a great deal of good work done, both prosthetic and operative, just as there is to-day, just as there will be a century from now, we may safely predict.

It is a matter of surprise to me that dentists are continually belittling dental literature. A few minutes glance at that excellent little work, the Dental Bibliography, compiled by Geo. C. Crowley in 1885, will show that from 1536 to date there never has been a time when the dental profession has not had a literature distinct-

ively its own; a literature that may be compared without disparagement with that of any science of equal age. Since at least 1536 there has been a steady output of dental literature for popular reading and for professional use, treating upon all branches of our specialty, constantly keeping it in touch with the steady advances of the collateral sciences. If the doctor will look at the advertising sheet at the back of the copy of Harris, of which he speaks, I think he will there find a list of dental publications, by no means, however, a complete one. In addition to the reprints of the American Association, we may name as then in constant use the works of Arthur, Piggott, Handy, Bond, Flagg, Taft, Horner, Robertson and Richardson, without exhausting the list.

Looking backward, our profession in the United States has no cause to be ashamed of its representatives of nearly a century ago—of Josiah Flagg, John Greenwood, the elder Gardett, Hudson, Wooffendale of New York, the Parmley brothers, Horace Hayden, the Spooners, and their colaborers. They came from the army and from the navy; some were turners, and some were blacksmiths; others workers in brass, or wood, or stone; some were scholarly men, and others educated only in finger-craft; some from the pulpit and the schoolmaster's desk; indeed, almost every honorable pursuit contributed to fill the ranks of those who by their good work, and the original and practical ideas they introduced, gave to the dental profession in America its grand unlift, and attracted to it the admiration of the world. Let us not, however, forget that the dental science we now know, and the high professional standing of which we are so justly proud, is cosmopolitan. The German and the French, the English and the American, assisted by every civilized people on the globe, have helped to make it what it is.

REPLY TO DR. MILLS' CRITICISM.

By I. A. Freeman, D.D.S., Chicago.

In reply to the criticism of my paper by Dr. G. Alden Mills in the April number of the Dental Digest, I would say that my statement did not refer to Dr. Riggs' treatment of the so-called Riggs' disease, nor to his instruments, but rather to the instruments then found in the dental depots, and that the disease was rarely ever treated, for it was generally considered by members of the profession

to be incurable. Dr. Riggs doubtless treated, and in many instances cured those suffering from this disease, but little is known, however, of his manner of procedure. As stated in the American System of Dentistry, Dr. Riggs treated the subject orally, giving his treatment clinically and not writing upon the subject; hence but little is found in the way of record of the procedure adopted by him.

Now doubtless Dr. G. Alden Mills treated pyorrhea alveolaris a la Dr. Riggs, because he was fortunate enough to come under Dr. Riggs' pupilage; however, he is but one out of many who were practicing dentistry thirty years ago, so that the statement that it was rarely ever treated holds good. A very common remark then was, that there was no cure for the so-called Riggs' disease. The scalers in common use then were heavy and unfit for the removal of calcific deposits upon the teeth. It is true, in view of those obtainable at all dental supply houses at the time, that the removal of such deposits then must have been attended with great pain and suffering to the patient.

TRICHLORACETIC ACID AS A SOLVENT OF NECROSIS.

By H. W. Allwine, D.D.S., Omaha, Neb.

Much has been and is written on the treatment of pyorrhea alveolaris, but it is not my intention to discuss the disease in this connection; but, on account of the uniformly satisfactory results reached by using trichloracetic acid in the treatment of pyorrhea, to earnestly advocate it. By a properly continued use of this acid at regular periods, and an antiseptic mouthwash at all times, I have obtained better results than by any other treatment.

Knowing that the treatment of pyorrhea alveolaris requires medicaments which dissolve calcareous matter as well as break down diseased soft tissue and stimulate new granulations, I determined to give it a thorough test in treating a case of necrosis that was sent to me, which I now describe. There is no reason, in my mind, why treatment of the two diseases should not be very similar.

Last June Mrs. B. consulted a physician concerning a trouble apparently over or at the symphysis of the inferior maxillary, and the case was placed in my hands by him. At that time the muscles about the chin were very tender and painful to the least motion, swollen, and of a dark blue color on the outside, as well as about the roots of the teeth. A fistula had formed over the root of the

left lateral, from which pus exuded. This tooth was also quite sore to the touch.

I believed the pulp of this tooth was dead, and proceeded to drill into the lingual surface of the tooth. Before proceeding far I discovered my error. I forced mild antiseptics into the fistula, applied a counter-irritant, and dismissed the patient, that I might give the case careful study. In a few days the lady returned. It being a clear day, I noticed a very slight discoloration of the two centrals. These teeth were not in the least sore, but on drilling into them I found the pulps dead. The probe passed through the fistula indicated the unmistakable roughness of necrosis to the touch of the physician and surgeon, and to my own.

The quickest way out of the difficulty I thought was to make an incision and remove the cause. I also suggested to the patient the possibility of dissolving the dead structure with acid, though it might require a long time. She much preferred a fair trial of the latter method, so about once in two weeks I injected a 10 per cent solution of trichloracetic acid. Twice a week a mild antiseptic was passed into the left central, through the fistula. The apex of the right central was open nicely, but I could force nothing through the fistula from this tooth. At each visit I packed the canals with cotton saturated with mild antiseptics and carefully sealed the cavities. I thus treated the case nearly three months. Indications being very favorable, I packed the canals, sealed the cavities, and told the patient to return in two weeks. At this time a very little healthy serum was found in the left central. I treated the case as before, and told the patient to return two weeks later. Then the conditions were such as I wished to have, and I proeeeded to put in the fillings. This was done the latter part of September. December 11 I saw the case. The condition was entirely satisfactory, and I believe a permanent cure was effected.

I will state briefly the history of the case. In February, 1895, Mrs. B. noticed a slight neuralgic pain in the chin, the muscles inclining to be a little stiff. This continued to grow worse, and the latter part of December, 1895, a fistula formed, as above described, and pus continued to discharge. She herself made various local applications, but the condition continuing to grow worse, she became anxious and sought advice, as previously stated.

It is very desirable that causes should be ascertained. In this

case I do not find one that to me is satisfactory. Mrs. B. is 32 years of age, of mixed temperament, the bilious predominating, and of very regular habits. She is a regular, systematic pedestrian. Her health is and has been good. No calcareous nodules or deposits were found in the root-canals. No injury of any kind had been received in the vicinity of the trouble. Prior to coming here from New York State her energies were taxed somewhat, on account of sickness in the family. I should not look to the climatic change as the cause. November, 1894, shortly before the appearance of disturbance, there was suppressed menstruation, which she thought at the time might be impregnation, but it was not. Was the cause a combination of the last three conditions and changes?

COCAIN is not soluble in vaselin or lard, but is readily so in olive or castor oil.—*Sage.*

GOOD WATER.—Koch said that water is good unless it contains over 100 microbes to the cubic centimeter. Franland says that there may be many more in good water.—*Am. Micros. Journal.*

RELATION OF CHRONIC DISEASE OF THE NOSE AND THROAT TO DISORDERS OF DIGESTION.—Dr. French believes that the great majority of sufferers from chronic disease of the nose and throat are the subjects of some derangement of the gastro-intestinal tract. He attributes this to the American habit of hasty and irregular eating. In a considerable number of individuals examined by him, all but a very few had evidence of some pharyngeal trouble, associated with disturbed digestion of the stomach and intestines. He lays stress upon the importance of giving this portion of the economy deserving recognition in patients presenting for local treatment.—*N. Y. Med. Journal.*

INFILTRATING DENTAL AND OSSEOUS TISSUES FOR MICROSCOPICAL WORK.—At a recent meeting of the Odontological Society of Great Britain Mr. Charters White gave the details of the method he adopts to demonstrate the presence of spaces in hard sections of dental and osseous tissues. The section to be treated must be ground moderately thin, to about $\frac{1}{32}$ inch, and then immersed in absolute alcohol for five minutes, and subsequently in ether for a similar period. It is next transferred to a thin solution of celloidin (three grains of celloidin to half an ounce of equal parts of absolute alcohol and ether). This solution is colored red by the addition of fuchsin, the stain being added to the alcohol before the celloidin is dissolved. The specimen is allowed to remain in the solution for two or three days, after which it is removed and placed on paper to dry. The section is then ground to the desired tenuity and mounted on balsam. The advantages of the process are (1) the cavernous and tubular structures in dentin and bone are filled with a colored medium, which prevents the balsam from running into such spaces and so obliterating them; and (2) the section is rendered less brittle and so can be easily ground down without much fear of fracture.—*English Mechanic.*

Digests.

THE NEW ANTISEPTICS OF DR. CREDE: SILVER AND THE SILVER SALTS AND THEIR USE IN DENTISTRY. By Dr. M. Hille, Dresden. Read before Dental Association of the Kingdom of Saxony, Oct. 24, 1896. Though modern surgery has turned from antisepsis to asepsis, the former is by no means superfluous. Asepsis cannot be obtained in many conditions in which the external circumstances are such that microbic infection cannot be prevented, or where it has already occurred. Moreover, antisepsis often gives us quicker and better results than does asepsis. Especially is this the case in the mouth, the field of our special labors, which is a perfect culture oven of exogenous and endogenous microorganisms, and where aseptic procedures are entirely applicable. We dentists are compelled to rely on antiseptics; and if I propose a new one to you and recommend it most warmly, it is because of the good results that I have obtained with it in various departments of our specialty.

The ideal antiseptic must possess the following properties: It must be harmless, non-poisonous and non-irritating; it must be fatal to all pathogenic spores and microbes; it must have no deleterious or destructive effect upon the tissues; it must be in a form that renders its application possible in the most difficult localities; and, finally, it should be sufficiently far-reaching in its effects to penetrate the deeper tissues and destroy the germs that may have penetrated to them. None of our previous antiseptics fulfill these conditions. Crede believes that two new ones, the citrate of silver and the lactate of silver, really do so, and his conclusions are confirmed by those of Halsted, Beyer and others. His bacteriological and clinical experimentation in the Carola Hospital of Dresden have given surprisingly good results.

We dentists are well aware of the fact that the precious metals, in proper form, hinder the growth of the schizomycetes; that gold fillings are more resistant and more durable than others. I, with Miller, ascribe it in part at least to this fact, though something may be due to the greater care with which fillings of the precious metals are made. Gold plates are better borne by the oral mucous membrane than those made of hard rubber. It seems to be proven that

various metals, more especially mercury, silver and gold, have antiseptic properties; whilst zinc, lead and iron seem to be quite powerless in this regard. The laboratory experiments and clinical researches of Crede and Beyer were so entirely satisfactory that I resolved to try the new antiseptics in dental work. In the sterilization of root sinuses I thought that they would be specially useful. My trials were made upon teeth with freshly killed pulps, as well as upon those in which the pulps had become gangrenous, and include about one hundred cases. And I may state at once that my hopes were not disappointed. The results that I have obtained during the last half year have been entirely satisfactory to me, and I can warmly recommend these preparations to my colleagues.

I directed all the patients that I treated with silver salts to return to me at once as soon as any pain occurred in the teeth that had been treated. Up to the time of this present writing only three have reappeared with periostitis, and in two out of these three the defects in the molars were distal and difficult to get at.

My method of root treatment is the following: I open the pulp cavity with a suitable trephine, and if the pulp is gangrenous, clean it out as thoroughly as possible with a thin probe. Then I thoroughly and repeatedly inject out the root-canal with a freshly prepared and dilute solution (1 : 2,000) of the lactate of silver. Then I apply the rubber dam, dry the cavity thoroughly with cotton and then thoroughly with the warm-air injector, to the completeness of which procedure I attach the greatest weight. For I believe that even if dead nerve tissue remains behind, further decomposition and development of the gases of putrefaction cannot so readily occur if all moisture be thoroughly removed, and the mummification of whatever nervous tissue is left behind be effected. Here the powdered citrate of silver is of especial value, since it not only disinfects the decomposition products that remain, but also acts as a dessicant in consequence of its powdered form. As is well known, the difficulty in the sterilization of root-canals depends on the difficulty of thoroughly applying the antiseptic to them. I believe that it is best done by applying the citrate through an insufflator, to the nozzle of which a rubber tube with a very small orifice is attached; this permits the application to be made to all the sinuosities of even the distal canal. The pulverization is fairly forcible, and, if the lumen of canal be sufficiently large, I do not doubt that particles

of the drug reach the very ends of the sinuses. If the insufflator does not seem to have effected this, I apply the powdered citrate to the depths of the canal on a thin probe.

Recently killed pulps I usually fill at one sitting, simply dusting in the citrate after opening the cavity with a sterilized bur, and filling with tin or gutta-percha in the usual manner. When the root-canals are putrid I deem it necessary to make two or three applications and insufflations of the citrate or the lactate before proceeding to the permanent filling. It is surprising to see that in most cases after the first introduction of the silver salt the odor of decomposition entirely disappears. I have seen no discoloration of the teeth in the cases that have returned to me; it is true, however, that they were all molar cases. Only the cavities were colored black. Irritation symptoms after the applications were never noted. I do not claim that this method of the treatment of roots is the only proper one, for there are almost as many different methods as there are practitioners of dentistry, but with these antiseptics I have formulated a suitable and effective system of treatment.

In conclusion let me state that I have used the silver preparations in various other diseases. I have used the gray silver gauze in one case of empyema of the antrum of Highmore, and as a tampon for the hemorrhage following extractions, and also the dilute solutions as gargles in stomatitis; and I have obtained like satisfactory results with them. The small number of cases over which my experience extends are too few to base a final judgment on, but the good results enable me to recommend that these silver salts be extensively experimented with and tried by others, and I should be glad to stimulate those of my colleagues who have not yet used them to do so.—*Deutsche Monatsschrift fur Zahnheilkunde, May, 1897.*

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REPLACEMENT OF A FRACTURED PORTION OF A CENTRAL INCISOR. By C. Robbins, L.D.S. Eng. In September last a young lady, aged 15, was looking at a hockey match, when a large pebble, accidentally hit by one of the players, struck her in the mouth, breaking off the mesial corner of the right central. This corner fortunately fell into the mouth and was carefully preserved. The fracture was not sufficient to involve the pulp. Nitrate of silver was applied to the sensitive dentin and a model taken. At a later date the small tip of tooth was carefully drilled at the strongest

part with the smallest rose-head bur, and into the hole thus made a platinum pin taken from a crushed artificial tooth was fitted and cemented, the platinum pin having been previously strengthened with a small quantity of gold solder. The rubber dam was applied, a small interstitial gold filling drilled out, and from this point a double groove drilled. The platinum pin was then flattened so as to glide up this groove, and the entire thing secured with cement. A mistake made was in cementing in the platinum pin to the piece before trying in the mouth, for in one part the pin was so near the labial aspect of tooth that a pin point of cement showed, otherwise the only indication was the oblique crack in enamel. The tooth when seen recently was doing well.—*Jour. Brit. Dent. Assn., April, 1897.*

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LARGE MOUTH CONCRETION. By Dr. James Bell. Mrs. G——, aged 32, consulted me in September, 1896, for a large growth of long standing which filled the right buccal cavity and had caused ulceration through the upper lip and great deformity of face. At the age of 12 years she suffered from "fever," that lasted considerable time, followed by a slow convalescence, during which the teeth in the right side of the lower jaw became loose and dropped out one by one, but without any pain or ulceration of the gums. In about six months she began to notice a "shell-like" mass on the gums from which the teeth had fallen, apparently in the area occupied by the molars. For ten years this growth was gradual and gave little trouble; then deformity began and increased steadily, but it was only within a year that marked increase in the size of the mass and troublesome symptoms developed. The growth filled the whole right cheek and produced great fattening of the right side of the face and the right nostril; had ulcerated through the upper lip at one point, and the whole lip was greatly swollen. The point which presented at the angle of the mouth was evidently calcareous, but I mistook this for a simple coating. The fetor was horrible and the mouth so sensitive that manipulation was impossible. I looked upon it as a growth from the upper alveolar border, probably originally of the nature of epulis, but having recently (coincidently with the history of rapid increase in growth and symptoms) become malignant; so advised the removal of the upper jaw. She went home, but returned October 12, and prepared for operation on the 19th. When fully anesthetized I was able for the first time to make a critical ex-

amination, and then found to my surprise that the mass consisted simply of a large concretion the size of a large hen's-egg, lying free in the mouth, having formed a cavity for itself by displacement of the soft parts and absorption of the alveolar border of the lower jaw. It was so large that I removed it with considerable difficulty. A couple of teeth were imbedded in its lower border, and it was clearly an enormous growth of "tartar." The ulceration of the lip healed rapidly, and the patient was discharged in a week quite well, except for the deformity which had occurred during the growth of the mass. The mass, which was oval in shape, measured 13.5 centimeters in its greatest circumference, and 11 centimeters in its smallest circumference.—*Montreal Medical Journal.*

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COMPARATIVE VALUE OF EUCAIN AND COCAIN. By Dr. M. Reclus. The following results relative to the use of eucain and cocain are of interest to the profession, since the experiments which I have conducted have proven the following facts: (1) The injection of cocain is not painful, while that of eucain causes a certain smarting sensation. (2) Eucain is a vaso-dilator, while cocain is a vaso-constrictor; and with the former the field of operation is clouded by the flow of blood. (3) Eucain is a most excellent analgetic, although in deep operations the perception of pain seems to be somewhat more distinct than with cocain. (4) Anesthesia is more complete and of longer duration with cocain. If eucain were less toxic than cocain, it should still be preferred in spite of this slight inconvenience. In upwards of sixty experiments on animals it proved fully as toxic as cocain. I prefer the use of cocain as a local anesthetic since it gives a warning, as the patient shows symptoms of intoxication prior to death, while eucain causes death without premonitory evidences.—Translated by Dr. B. J. Cigrand, from *Presse Medicale, February, 1897.*

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ORAL SURGERY. By Edmund W. Roughton, B.S., M.D. (Lond.), F.R.C.S. Eng. *Foreign Bodies in the Nose.* These are more common in children than in adults. They are usually introduced in play. Sometimes the accident is noticed at once, and the child is brought to the surgeon with a distinct history of a foreign body having been introduced; the diagnosis is then easy, and removal can be effected with forceps or a bent probe. In the majority

of cases there is no history of any foreign body having been introduced, and the child is brought on account of a purulent discharge from one nostril. The pus may be sanious or brown, and in some cases very offensive. The occurrence of unilateral purulent discharge in a child should always lead to careful examination with speculum and probe, an anesthetic being given if necessary. In a recent case the foreign body will be easily seen, but if it has been long resident in the nose it may be hidden by swollen mucous membrane, granulations, blood or pus. If seen, it usually looks black, either because that is its natural color, or because it is covered with dried blood. When it cannot be seen the diagnosis must be made by the probe. It must be borne in mind that unilateral nasal discharge may sometimes result from syphilitic or tubercular disease, although these two conditions are much more common in adults and usually affect both sides of the nose.

Treatment. When the foreign body has been recently introduced it can usually be removed with a probe bent into a hook, or with a narrow-bladed pair of nasal forceps. When the foreign body has been impacted for some time an anesthetic should be administered; a finger should then be inserted into the naso-pharynx, lest the foreign body be pushed backwards and fall into the larynx. Sometimes the desired result may be obtained without any anesthetic, by forcing air or a stream of water into the opposite nostril whilst the mouth and the affected nostril are kept open.

Foreign Bodies in the Pharynx. For practical purposes they may be divided into two kinds. (*a*) Small and sharp, such as pins and fish-bones. These cause a sharp pain at the time of impaction, and subsequent irritation which may last for a long time, even after the intruder has been removed. (*b*) Large bodies, such as masses of food or tooth-plates. The chief symptom is dyspnea. Occasionally a large foreign body may lodge in the pharnyx and remain there without causing any serious trouble.

In all cases the nature and situation of the foreign body should be ascertained by careful inspection, aided by a good light and a laryngeal mirror. Sometimes the foreign body is hidden in a fold behind the tonsil and cannot be seen; in such cases the finger should be introduced and guided to the spot at which the patient feels pain. The finger should not be used until after failure of inspection, on account of the risk of driving a penetrating body further in, or even

perforating a large vessel, such as the carotid. When the position of the foreign body has been discovered, it can usually be removed by forceps of suitable length and shape. Large bodies with sharp corners, such as tooth-plates, when impacted low down may necessitate pharyngotomy.

Foreign Bodies in the Larynx. These may be divided into two classes, according to the symptoms they produce: (*a*) Those that are large and cause urgent dyspnea, or being small are so placed as to impede respiration. (*b*) Those that are small and which after the first paroxysm do not cause dyspnea.

The symptoms may be divided into three stages: (1) Those of obstruction immediately following the introduction of the substance. (2) Those of irritation produced by its presence. (3) Those of inflammation coming on at a later period. (1) Symptoms of Obstruction.—When a large body, such as a piece of meat, becomes impacted at the entrance of the larynx it may cause instant suffocation. Smaller bodies may also cause intense, even fatal dyspnea by setting up reflex spasm of the glottis. (2) Symptoms of Irritation.—The patient is usually first seen by the surgeon after the first attack of dyspnea has passed off. The voice is then hoarse and croupy, there is a loud, rough sound in respiration, which is more or less impeded and attended by attacks of spasmodic cough. In adults a laryngoscopic examination may be made in the intervals between the attacks and the position of the foreign body ascertained. In children a laryngoscopic examination is almost impossible, but the foreign body may sometimes be detected by means of the finger passed down to the larynx. (3) Symptoms of Inflammation.—If the foreign body remain impacted in the larynx, in a day or two it will set up laryngitis, from which the patient may die.

Treatment. This must necessarily vary with the urgency of the symptoms and the nature of the foreign body. Where there is impending suffocation, and the substance cannot be dislodged with the finger, laryngotomy should be instantly performed, as this operation affords the easiest, safest and most rapid way of admitting air. When the symptoms are less urgent, a deliberate attempt should be made to remove the foreign body by forceps under the guidance of the laryngoscope. These means having failed, an external operation must be performed, the position of the opening being adapted to the position of the foreign body; thus when above the vocal chords,

sub-hyoid pharyngotomy should be performed; when between the cords, or in the ventricle, thyro-chondrotomy; when below the cords, laryngo-tracheotomy or tracheotomy.

Foreign Bodies in the Trachea and Bronchi. Small objects, such as buttons, coins, etc., may be drawn into the trachea, if a sudden inspiration is taken during the act of swallowing, or when such things are being held in the mouth. If the substance is light, it will probably remain free in the trachea, floating up and down with the current of air, but if heavy it will become impacted in the trachea or one of the bronchi. Elongated bodies, such as a piece of pencil, more often find their way into the left bronchus, as its axis is more in line with the trachea, whereas rounded bodies more often enter the right bronchus, as its lumen at the tracheal bifurcation is larger.

The symptoms are divisible into the same stages as those of laryngeal foreign bodies. At first there is an attack of urgent dyspnea, upon the subsidence of which the most characteristic symptom is paroxysmal suffocative cough and dyspnea, in consequence of the foreign body being driven up against the glottis. These attacks of cough occur only when the body is free to move in the trachea. When it has become impacted in one of the bronchi it prevents the air entering the corresponding lung, diminishing or abolishing the respiratory murmur. If the foreign body acts as a valve, and allows air to emerge from the lung whilst preventing any entering it, the result is collapse of the lung. If the foreign body remain long in the bronchus it is apt to set up bronchitis, pneumonia, or abscess in the lung; sometimes it may become encysted and do no further harm.

Treatment. Inversion and shaking may be tried in the first instance, but everything should be ready for immediate tracheotomy should the foreign body become impacted in the glottis. Probably the best treatment is to perform tracheotomy in every case, as soon as the patient comes under observation. It often happens that when the trachea is opened the foreign body is expelled through the wound, or even through the mouth. Should immediate expulsion not occur, no tracheotomy tube should be inserted, but the edges of the tracheal wound should be kept apart with blunt hooks. Search may then be made by means of tracheal forceps or bent wire.

Foreign Bodies in the Esophagus. Tooth-plates, coins, etc., most often lodge in the commencement of the esophagus opposite

the cricroid cartilage. The symptoms are pain, often referred to the episternal notch, a pricking sensation in the throat, difficulty in swallowing, and sometimes dyspnea if the foreign body exerts pressure on the air passage. Extraction may be effected by means of pharyngeal forceps, the coin-catcher, or the expanding horse-hair extractor. Should these means fail the case may be left for twenty-four hours if the substance is of a nature to become softer, and then a gentle attempt may be made to push it onwards towards the stomach with a sponge probang. If the foreign body resists all attempts at dislodgment, it may be necessary to open the esophagus in the neck, or even in the thorax by resecting a portion of the third, fourth and fifth ribs midway between the spine and the left scapula. Should an angular body such as a tooth-plate have passed into the stomach the patient should be directed to eat porridge, hair, cotton-wool, etc., so that the sharp projections may be sufficiently covered to pass along the intestine without doing harm. If the foreign body is too large to pass the pyloric valve, gastrotomy must be performed.—*British Journal of Dental Science, May, 1897.*

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CONSOLIDATION OF THE TWO ASSOCIATIONS. By Dr. B. H. Catching, Atlanta, Ga. Editorials, correspondence and observation have for some time indicated a necessary change in the national dental organization of the United States. It has not required the closest observation to see that neither the American nor the Southern Dental Association is measuring up to the standard required by the advanced position of the dental profession. They have served a good purpose and are now ready to give way to an organization which shall unite the profession as a whole and render results commensurate with the calling of which it should be the representative.

There should be no obstacle thrown in the way of such an organization. While some may have feelings of strong attachment to the existing associations, yet they should lay sentiment aside for professional advancement. The men who have been in the forefront of professional life and progress will almost to a man join in this move.

From a sectional standpoint there may have once existed a reason for the two separate organizations. That reason no longer has force in the minds of those who think above sectionalism. The spirit dominating the mind of the sectionalist is not the spirit of progres-

sion, but of retrogression. There are enough men in the dental profession whose minds are sufficiently cultivated and enlarged to form an organization which shall represent the advanced thought and progress of the age.

This is not the time to set forth plans for such an association, but it is not out of place to consider the plan as proposed by Dr. Harlan, who, as president of the American Dental Association in 1891, made the suggestion of dividing the country into quarter sections—namely, northeastern, southeastern, northwestern and southwestern, each division to have an organization to be known by the name of its respective territory; each division to meet annually, working under the same rules. From the four divisions organize a national association to meet quadrennially at a given point, at which place would be a museum, library and apparatus for research.

This seems to be an admirable suggestion, one not only feasible but practicable. This country is too large to be well represented annually in one organization. Distances are too great. As it stands, one-half the country is virtually denied the privilege of a national gathering. The quarterly division of the country, with an organization in each, would give that location which has been denied the benefit of organization, save state associations, vast advantages. Neither the American nor the Southern Dental Association can hold successful meetings west of the Mississippi River. Neither can the American have a large meeting if held in the south, especially if the time is in the summer months. Every section of the country would be benefited by such a division of territory. Each section would vie with the other in good work. There would be a stimulus that is badly needed given to dental meetings; such a stimulus would bring forth work deserving a high calling, and lift association work out of the ruts in which it has been running for many years. Everything can be said in favor of this plan and nothing can be said against it. —*International Dental Journal, May, 1897.*

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"NOT FAILURE, BUT LOW AIM IS CRIME." By J. G. W. Werner, D. M. D., Boston. Read before American Academy of Dental Science, Dec. 2, 1896. What are some of the most essential qualities of a successful dental practitioner? First, as stated in my prefix, a quotation from Lowell, all of us should *aim high*, for a low aim in our profession is more criminal than an *honest failure.* Con-

scientiousness should predominate, direct and guide us in all our work. Second, moral purity and integrity of character are necessary if we would win the confidence of our patients. At this critical period of psychological study and research, when from infancy and childhood we are subjected to such searching scrutiny, is it any wonder that we human beings become so sensitive that a moral taint of any kind is quickly felt or detected at a glance, and an instantaneous aversion or repugnance is the consequence? Who has not experienced this feeling on coming in contact with certain persons, though they be comparative strangers and the meeting only casual? How much more keenly must such repugnance or aversion be intensified in the close personal relation that necessarily exists between the operator and his patient, if he is not morally pure.

Then, as, so often and so aptly quoted, "cleanliness is next to godliness," the most scrupulous care and attention must be given to personal neatness in every detail, especially in regard to the hands, nails and breath. A simple lotion of rose-water, glycerin and alcohol is an agreeable application to use each time after washing the hands. The operating-coat should be suitable in texture and color and always neat and clean. In the office and operating-room an atmosphere of immaculate neatness and thorough ventilation should prevail. It is indispensable that no odor of medicaments be detected either in the apartments or about the person of the operator. Nothing but the cleanest napery and the most thoroughly cleansed, sterilized and polished instruments should be used, especial care always being given to the mouth-mirror. The most careful dentists insist upon individual mouth-mirrors.

As few as possible of the necessary instruments and appliances should be exposed to view, thus avoiding undue suggestion of the operation to the patient. With the constant multiplicity of equipments there is also a danger of the operating-room having the appearance of a machine-shop.

One of the most helpful and essential factors of a well-appointed office and operating-room—one that greatly facilitates the operations; that attends to the appointments and cares for the instruments, and gives tone to the whole place—is the neat, refined, and well-trained lady assistant. In my estimation, she is an indispensable adjunct in our work.

The third essential is professional skill and ability. Nothing is

of greater value and importance to the operator in this direction than the acquiring and possession of a gentle yet firm and sure touch. For what can weary and excite a patient more than the uncertain or unskilled handling of sharp instruments, where a sudden slip might lacerate the pulp or inflict a wound upon the surrounding tissues? The awkward, noisy, or unskillful manipulation of the instruments, either by the operator or his assistant, is also a great annoyance, and produces an undesirable effect in the mind of the patient. Much valuable time may be wasted by an unsystematic arrangement of the necessary instruments for daily use, or from an unfamiliarity with and an unskilled use of the same, and also by an indecision in quickly selecting the one best suited for a particular case. A good rule is to have a few carefully selected instruments, and learn to use them well.

Fourth, tact, in my opinion, is an important factor in meeting our patients, and in successfully allaying any fear or apprehension that naturally arises in the mind of the one who is about to undergo either a surgical operation or a medical treatment. A quiet, reassuring demeanor, and a few kindly sympathetic words help greatly to accomplish this; while nervous movements, brusque manners, harsh or careless expressions tend—especially with women and children—to create distrust and antagonism, and will repel the patient.

Another important point, but one delicate to emphasize, is the need of our patients understanding the necessity of constant care of the mouth. A thorough brushing and massaging of the gums as well as the teeth several times daily, and an occasional scraping of the tongue, are invaluable. A neglect of such care, I believe, is at the foundation of the so-prevalent pyorrhea alveolaris.

Every operator in treating decay in approximate surfaces should endeavor to fully restore contour, thereby greatly promoting the comfort of his patient and the general healthfulness of the mouth. For the normal arrangement of the teeth is a continuous, uninterrupted grinding surface, and spaces between approximate surfaces are unclean, annoying and detrimental.

I might suggest other subjects for our consideration, such as the treatment of root-canals, the importance and various methods of separating the teeth before operating upon them, the preference for certain filling-materials under certain conditions, etc., all of which, when rightly understood and conscientiously practiced, would help us

to attain that success at which we all aim; but I will speak of only one more—namely, the great importance of good health to the operator. Sir Benjamin Richardson, M.D., of England, thinks that the normal period of human life is about one hundred and ten years, and that seven out of ten people could live that long if they lived in the right way. They should cultivate a spirit of serene cheerfulness under all circumstances, and should learn to like physical exercise in a scientific way. "No man," he says, "need be particularly abstemious in regard to any article of food, for the secret of long life does not lie there. A happy disposition, plenty of sleep, a temperate gratification of all natural appetites, and the right kind of physical exercise will insure longevity to most people." Unfortunately for his excellent theory, this celebrated physician and author of hygienic works died from apoplexy at the age of only sixty-eight years.

Practicing dentistry, like most indoor occupations, has its detrimental effects; it tends towards short life instead of longevity; and it becomes our duty to counteract the injurious effects that our calling produces. In a general way, we may say that dentists look pale; have a tendency towards nervousness; are more or less dyspeptic; have an enfeebled circulation, heart-action and respiratory function; acquire a contracted chest, and are short-breathed. When we take into consideration our contracted position at the chair; the inhaling into our lungs more or less of the exhalations from the patient, such exhalations containing one of the most poisonous known alkaloids or ptomaines in existence; as well as the general nervous, strained condition that we are in while doing minute, delicate work, and all the time trying not to hurt; or, if we do inflict pain, to have a sympathetic perception of the same; it is not strange that all these should produce an enfeebled condition of health. When we ponder this fact we must see at a glance the desirability, yes, necessity, of taking regular out-of-door exercise.

For years I have made it a point to work in a gymnasium; to keep an erect posture; to expand the chest by practicing deep and full respiration; and have endeavored to be out of doors at least two hours out of the twenty-four, either walking, riding horseback, or bicycling. From years of personal experience I know the great benefit and tonic effect of regular daily cold-water bathing. Nothing rests me more than to get into a profuse perspiration from physical exercise and to take a quick cold bath afterward. If we wish to

keep in good health we must eliminate from the system the used-up, broken-down and effete matter; and we must not forget that through the skin, with its miles of eliminating and perspiratory ducts, is one of the best ways to accomplish this object.

As professional men we cannot place too high an estimate upon the great importance of unimpaired health. Good health so often means pure morals, cheerfulness, helpfulness, wholesomeness in every direction. Though I have spoken of good health last, I believe it is of almost the first importance, and in recapitulation I might say that some of the important essentials of a successful practitioner are first, health; second, tact; third, professional skill, conscientiousness and ability; fourth, integrity, moral and personal purity; and fifth, a high aim.—*International Dental Journal, May, 1897.*

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RADICAL TREATMENT OF CHRONIC ALVEOLAR ABSCESS. By S. H. Guilford, D.D.S., Ph.D. To the thoughtful mind it appears truly surprising that so little advance has been made in recent years in the treatment of obstinate cases of alveolar abscess. The line upon which the treatment of these cases is generally conducted varies but little from that of twenty-five or even forty years ago. Some minor changes have taken place, as in the variety of medicaments employed, and the forms of drills and other appliances for gaining access to the seat of disease, but the methods of treatment have undergone very little modification. The old method of treating serious pathological conditions existing at or near the end of the root, by forcing medicaments through the canal, still prevails to a surprising extent.

In alveolar abscess of recent origin, especially where the tooth is a single-rooted one, and where there is a fistula for the exit of pus or medicaments, treatment by way of the canal is not only justifiable, but oftentimes constitutes the simplest and most direct method of treatment; but where the root affected has a contracted canal and is more or less curved, as in certain molar roots, access to the seat of trouble is not only exceedingly difficult, but oftentimes impossible with any degree of certainty. Attempts to reach the apical end of the root in such cases, either by drilling or reaming, too often result in the unconscious perforation of the root at some point of its length, thus increasing the complications of the case and making failure more certain.

all cases of alveolar abscess of long standing, we have a complication that medicaments alone cannot possibly relieve. To effect a cure, the diseased bone must necessarily first be removed, after which medicaments or possibly the recuperative processes of nature, aided by antiseptic treatment, will give the desired result.

No one is so well equipped to perform this slight surgical operation as the dentist with his engine and burs and his correct knowledge of the anatomy of the parts. It is a very simple operation to lance the gum over the seat of the disease, drill through the process to the root apex, and then with a round bur of sufficient size cut off the apical end of the root and remove as much of the adjacent alveolar tissue as may seem to be affected. Previous to doing this the root should be permanently filled, for it cannot be done so well afterward. After the operation it is only necessary to wash the cavity well to remove all debris, pack with iodoform gauze, and leave the result to the kind hand of nature. This treatment of persistent alveolar abscess is radical, but it is also simple, and in the light of our present knowledge is the only rational method of treatment in cases of this character. Although it has not yet become a common practice it is growing in favor, and with those who do employ it is followed by the most satisfactory results. The day for long, fruitless treatment of cases of alveolar abscess, which by their obstinate resistance to medicinal treatment indicate necrotic associations, is past, and the sooner this is recognized the better it will be for both patient and operator.—*The Stomatologist, May, 1897.*

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CASE OF RETARDED ERUPTION OF CUSPIDS AND SUPPRESSION OF THE LATERALS TREATED BY THE INSERTION OF A DENTURE. By C. Robbins, L.D.S. Eng. This patient was a lady aged 17, in whose family there was a history of suppression of laterals and retarded eruption of permanent cuspids. In the patient's grandmother the cuspids had been erupted late, and had to be removed. A cousin of the patient was also minus centrals and laterals in the upper jaw. The treatment adopted was as follows: The upper centrals, which were widely separated from one another, were fitted with gold collars, small projections being added on the distal aspect to prevent the elastic bands from slipping up during the process of bringing the teeth together. The teeth proved to be very stubborn and resisted the action of elastic bands. "*Gill-*

It is no uncommon thing to meet with cases where an abscess has been treated for months or even longer by way of the canal, and after an abatement or temporary suspension of the manifestation of disease symptoms, the root has been filled only to revert to its former condition in a very little while. In other cases there is failure to obtain even sufficient temporary improvement to warrant the closure of the root-canal, and treatment is continued and continued in the hope that a change for the better may take place, until the patient is discouraged and either decides to consult some other practitioner, or insists upon the removal of the affected tooth.

Probably no class of cases gives the young practitioner more anxiety or causes him to feel his helplessness so much as those of persistent alveolar abscess. Of the letters asking advice, received by any dental college professor from young graduates, a large proportion will be found to bear upon this subject. They wish to know why the abscess does not yield to treatment and what medicaments other than those they have employed can be suggested for the case in hand. The feeling seems to prevail that the failure to secure success lies with the drugs they have employed, or possibly with the manner of their introduction. If the hidden parts that they are treating could be laid open to their view they would soon discover that the cause of their lack of success in treatment was due to a condition that drugs alone could not relieve—one that needed mechanical or surgical aid rather than medicinal.

The commonly accepted idea of an alveolar abscess is that of a sac at or near the end of a root, which has been formed by the pericementum becoming loosened from the cementum of the root through disease, and whose function has been so changed by pathological causes as to be pyogenic in character. That to restore the parts to health it is only necessary to treat the condition as we would treat an abscess anywhere in the soft tissues of the body; that is, to empty the sac, remove all traces of pus by syringing with water and hydrogen peroxid or pyrozon, and then apply some suitable cauterant and stimulant to alter the character of the secretions of the inclosing membrane. It must be borne in mind, however, that an alveolar abscess differs radically from one confined to the soft tissues alone in that it is so surrounded and inclosed by bony tissue that this latter becomes readily affected and destruction of its substance supervenes. When this necrosis occurs, as it does in all or nearly

the alveoli absorbed, and the maxillary sinus laid open in three places. It is also worthy of note that in no skull was the wear of the teeth enough to amount to anything. In one case only could the degree of wear be said to equal that of No. 2 of Broca's scale.

Suppressed Molars.—No. 40,618.—Skull of an adult male. The first thing that strikes one on taking up this skull is that it is too light, too smooth and too small to be that of a male; but, on the other hand, a closer and more careful inspection seems to convince one that it is entirely too heavy, too rough and too large to be the skull of a female, and so, without any serious questioning, I have considered it as a male skull. The upper left incisors and cuspid have been lost; their alveoli are perfect. The teeth present are sound and healthy. The jaws are markedly prognathic, and do not seem unusually short. In this skull both upper and lower third molars are entirely suppressed.

No. 40,607.—Whatever slight doubt there might have been in regard to the sex of the skull just described, there can be none here, for it is a typical skull of an adult female. There are two very striking features about this skull, apart from any consideration concerning the teeth. The first is the extreme prognathism of the entire face, and especially of the alveolar arches; and second, the very weak mental development of the lower jaw. The upper left third molar is present, but is crowded upward and backward until it almost rests on the alveolar arch just behind the last lower molar. In life it must have pressed heavily on the gum. The remaining three third molars are suppressed. All the other teeth are present and in perfect condition.

No. 40,620.—Skull of an adult male, of slightly advanced age. Only the following teeth are in situ: upper right cuspid, left cuspid and second bicuspid, and lower right second and third molars and left first and second molars. These teeth are somewhat worn. None of the alveoli of the other teeth are closed. The upper third molar on each side is entirely suppressed. Reference has already been made to the lower jaw of this skull. It may not be without some interest to record its condition a little more fully. The right body shows very plainly the lines of union of an old fracture which evidently extended through the bone and involved the alveoli of the second bicuspid and the first molar. At this point exists a deep

ing twine" was then used with marked results, the teeth being brought into actual touch in ten days. After the teeth had been kept in position for a short time, an ordinary small vulcanite suction plate was fitted, carrying the missing laterals and one cuspid.—*Jour. Brit. Dental Assn., April, 1897.*

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NUMERICAL VARIATIONS IN THE MOLAR TEETH OF FIFTEEN NEW GUINEA CRANIA. By George A. Dorsey, Ph. D., Assistant Curator of Anthropology, Field Columbian Museum, Chicago, Ill. While recently examining a series of Papuan skulls, I was surprised to find the range of variation in the molar teeth to be so great. It is not often that within the compass of a small collection of crania from a single locality one sees so beautifully illustrated the now common enough observation that in the course of man's phylogenetic development he has already lost one or more pairs of teeth, and is about to lose one more. To be more exact, there are in the series three examples of suppressed third molars, and two examples of a supernumerary molar. Without entering into a discussion as to the morphological signification of anomalous conditions of this sort, I shall simply record the facts as they exist. Those who are interested in a discussion of the signification of such observations as I shall have to record, will find the whole matter of numerical anomalies in the teeth summed up briefly and well in Weidersheim's Structure of Man, pp. 156-161.

The collection of crania under consideration was purchased from a trader who brought them from New Guinea, where they had graced the home of a native chief, who prized them as trophies of victims slain in war. They are of more than usual interest because the frontal bone of each skull is ornamented by incised carvings of a symbolical character, and the lower jaw is held in place by a band passing through the nares and around the symphisis, and by other bands which pass through a hole in the ramus just beneath the sigmoid notch and are fastened to the zygomatic arches.

It is a remarkable fact that, so far as I can see, there is not an unsound or diseased tooth in the entire series; nor, with but two exceptions, is there a single case where a tooth had been lost and the alveolus absorbed. In the first exception the lower jaw has been fractured, and as a result the alveoli of two molars are destroyed; in the second case the molars on one side are gone,

circular excavation which extends down into the jaw for more than half its normal depth, and gives rise to a rounded eminence on its inferior surface.

Supernumerary Molars.—No. 40,614.—Skull of an adult male, of large capacity and good development. Only the lower molars and upper first molars, right cuspid and first bicuspid are in situ. The remaining alveoli are all open and in good condition; many of them, however, contain tooth-like plugs of wood, put in after death for adornment. As the lower jaw of this skull is detachable, it is possible to examine in some detail the cusps of the teeth. The upper first molars, the only ones present, have each five cusps, the extra cusp being situated just posterior and a little to the labial side of the oblique ridge which connects the anterior lingual with the posterior labial cusp. The second molars have only two fangs, and these are merely indicated in the alveolus by a slight median ridge on its posterior surface. The cusps in the lower molars are normal; that is, the first has five, the second and third have four each.

The supernumerary bicuspid occurs in the lower jaw on the right side, opposite to the interval between the first and second bicuspids, on the lingual side. Just the crown of the tooth is visible, and during life it evidently had scarcely begun to enter the gum. The crown is 7 mm. long and 5 mm. in its antero-posterior diameter. The tooth is bicuspidate and, so far as the crown is concerned, does not differ from the ordinary bicuspid tooth.

No. 40,611.—Skull of an adult female. In many respects, so far as its general character goes, it does not differ materially from number 40,607, which has already been described. The decided alveolar prognathism is very striking. In this skull also the lower jaw can be detached and we can study the hard palate as well as the teeth. The palate is remarkable for its great depth in proportion to the general size of the face; it measures more than 15 mm. in several places. There is a well defined *torus palatinus*, and the transverse palatine suture is not straight, but irregularly oblique on each side, owing to the encroachment, along the median line, of the palatine plates on the maxillary bones. Both of these conditions are more often associated with the dark races than with the white, and are the usual condition in some of the anthropoid apes. The upper right mesial incisor, left incisors and cuspid, and the lower left lateral incisor, cuspid and first bicuspid teeth have been lost; their

alveoli are perfect. The other teeth are all present and in sound, good condition. The most striking feature in regard to the teeth present, and one which is apparent at even a superficial glance, is their very large size. This may best be shown by reference to the *dental index* of Flower. The dental length (the distance from the anterior surface of the first bicuspid to the posterior surface of the third molar of the upper jaw) is 46 mm.; the basi-nasal length (the distance from the median anterior border of the foramen magnum to the naso-frontal suture) is 94 mm. From these we obtain the dental index by this formula:

$$\frac{\text{dental length} \times 100}{\text{basi-nasal length}}$$

which in this case is 48.9; the average for both sexes in the Papuans being 44.2, and in Europeans, 41.3.

The first upper molars have five cusps, the second molars four, and the third molars five, a very unusual condition. It is also to be noted that the third molar is distinctively larger than the second, and fully as large as, if not a trifle larger than the first molar; this is true of the right side only. Of the lower molars, the first and third have five cusps, or the usual number; the second has only four, or one less than the usual number. The supernumerary tooth is situated in the lower jaw on the right side, between and internal to the second bicuspid and the first molar. The root of the tooth seems to lie nearer that of the molar than that of the bicuspid. The crown is directed considerably inward and slightly forward. In character it approximates the first bicuspid rather than the second, in that the lingual cusp is much smaller than the labial, and furthermore, it does not possess that quadrate form which is so characteristic of the second lower bicuspid. The crown has barely cleared itself of the alveolus, and it is not likely that it had as yet made its way through the gum. Only the superior and a very slight portion of its anterior surface is visible. The crown measures 8 mm. in length and 7 mm. in its antero-posterior diameter.

Summary.—No. 40,618.—Male skull, with upper and lower third molars suppressed. No. 40,607.—Female skull, with one upper and both lower third molars suppressed. No. 40,620.—Male skull, with upper third molars suppressed. No. 40,614.—Male skull, with supernumerary lower left bicuspid. No. 40,611.—Female skull, with supernumerary lower right bicuspid.—*Dental Review, April, 1897.*

MICROSCOPICAL ASPECT OF CERTAIN LESIONS INDUCED BY DENTAL CARIES. By A. Hopewell Smith, L.R.C.P. Lond., M.R.C.S., L.D.S. Eng. Read before Odont. Society of Gt. Britain. In directing your attention for a brief space of time to-night to the consideration of the communication which has been announced, the subject will be approached from a somewhat different standpoint to that usually included under similar titles. Literally speaking, the study of local lesions induced by dental caries assumes vast proportions, and embraces numerous side issues. To the chief striking and important points of a patho-histological nature that are found in sections of carious teeth these remarks will be strictly confined; the main attempt being devoted to descriptions of specimens prepared by those decalcifying processes in which the hard and soft parts are retained in close anatomical relationship. As the majority of the pathological conditions met with in the mouth are due to causes which operate from the outside, only a few being produced by endogenetic disturbances, this paper will treat of some of the many conditions primarily brought about by extrinsic or purely dentinal changes.

It is extremely probable that morbid affections of Nasmyth's membrane and enamel per se (products of the stomodæl epiblast) have a certain influence on the subjacent tissues, but of this part of the subject we need not now speak. It is considering the variations that take place before and after carious penetration into the pulp-chamber with which we have here to deal. But caries is not the sole factor in the formation of calcareous masses in the pulp and on the walls of its cavity; traumatism, senile changes, and idiopathic conditions frequently share in its production.

It would save a great confusion of ideas if three kinds of dentinal deposition were generally recognized: (1) Calcareous degeneration of the pulp, a constant accompaniment of caries, but also found occasionally in sound teeth as the result of vascular changes due to idiopathic or constitutional causes. (2) Secondary dentin, occurring not only as a pathological process in cases of attrition, abrasion or fracture, but physiologically, as the result of senile changes in both permanent and long-retained deciduous teeth; and (3) Adventitious dentin, the product of caries. Salter's patient and remarkable investigations in this particular portion of dental pathology led him to classify all forms of dentin deposition as secondary

dentin, and in a sense this was perfectly correct. But the term seems to require a more definite meaning, for he describes under this one heading three forms, viz., dentin of repair, dentin excrescence, and osteo-dentin or intrinsic calcification of the pulp.

The adjoining scheme is intended to show the chief results of pathological changes taking place in dentin and pulp of a tooth.

I. *Calcareous degeneration of Pulp*, through changes in pulp alone.	(*a*) Common. Due to vascular changes in pulp, in association with caries. (*b*) Rare. Due to idiopathic or constitutional changes, *e. g.*, gout.
II. *Secondary dentin in Pulp Cavity*, through changes in the primary dentin and pulp.	(*a*) Physiological. Due to senile conditions of both permanent and long-retained deciduous teeth. (*b*) Pathological. Due to attrition, abrasion, or fracture.
III. *Adventitious dentin in Pulp Cavity*, through changes in the primary dentin and pulp.	Due to caries.

Peripheral carious stimulation of the dentin is accompanied by destructive as well as constructive metamorphoses; tissue waste and tissue repair go on side by side. At first the soft parts alone suffer; the dentinal fibrils and their inclosing tubules, in parts of their courses, are affected and soon become disorganized, the blood-vessels and tissue of the pulp undergo hyperemic and other changes. Thus a superficial carious patch beneath the enamel is associated with marked cellular activity on the part of the pulp; while there is a loss of substance externally, there is a gain internally. This is exemplified in the formation under certain circumstances of "dentin of repair." In other words, caries, even in its early stages, usually leads to a deposit of new adventitious dentin on the surface of the pulp. But later on bacterial agencies multiply and accumulate, advancement renders them still more potent, and development means destruction. For now not only do the dentinal tubules and matrix also become involved in the general dissolution, but any adventitious tissues that may have been developed rapidly break down, and soon the work of demolition is complete. A study of these phenomena possesses several points of profound interest.

(A) *Conditions associated with Superficial Caries.* Viewed from a clinical aspect, it may be said that the commencement of caries is marked, as a rule, by one or two distinct types of lesions:

(1) the not uncommon clean-cut cavity which by its general appearance suggests erosion, and (2) the usual cavity of decay. The former is distinguished by its position on the cervical portion of the labial aspect of the anterior teeth, and by its intense hyperesthesia on receiving interrupted tactile impressions; the latter is recognized by its inability to transmit slight functional impulses to the pulp. Microscopically the difference between these two classes is well defined, the first named particularly presenting marked deviations from the usual type of decay.

(1) Here the sub-enamel region of the dentin contains not only the usual "granular layer," but also areas occupied by large interglobular spaces, which are distributed with more or less regularity throughout its substance. Microorganisms are present in enormous numbers at the margin of the cavity, and fill the tubules for varying distances. Opposite the breach of surface a corresponding deposit of adventitious dentin with enlarged irregular tubules is observed. The layer of tissue "on the borderland of calcification" is increased in thickness and exhibits a greater quantity of calcoglobular masses than normally. They are, however, very small. In the pulp, slight hyperemia and cell proliferation have certainly occurred in this locality and its neighborhood; and the peripheral cells, which present many of the appearances of the so-called odontoblasts, are multiplied greatly. Beyond, the tissues may be considered to be normal, with the exception perhaps of the smaller blood-vessels, whose lamina are more or less increased in size. Rounded cylindrical deposits of new dentin constantly exist in the central portions of the pulp, and point to a degenerative process. The changes from the normal to the pathological areas are very gradual, no sharp line of demarcation cutting them off from the other parts of the soft tissues.

Referring to the statement just enunciated that "the so-called odontoblasts are multiplied greatly," it must not be inferred that these cells are merely increased in point of numbers. They are profoundly modified, inasmuch as they now possess certain new characteristics. Their nuclei have become elongated and flattened, and are rendered very prominent when any of the nuclear stains have been used, and perhaps they are more granular than usual. The cell walls are indistinguishable, chiefly from the fact that each odontoblast is compressed laterally by its neighbors. In some instances

they are gathered into sheaves. Some observers might describe the appearances as being due to an indirect splitting-up of the cells, and it is not difficult to conceive an odontoblast, when once fully formed, undergoing the process of karyokinesis. In sections prepared by Weil's method, microscopically the tubules in the primary dentin below the breach of surface are unaffected by stains and clearly differentiated from other tubules, and a band of altered pulp tissue extends right across that organ. Thus at the very outset we meet with two most remarkable conditions, and our attention is immediately arrested by their presence. These are the multiplication of the numbers of interglobular spaces, and also of the so-called odontoblast cells—phenomena which are entirely absent from all ordinary conditions. There would, therefore, seem to be some connection between the subjective symptoms of pain and these fresh developments—or at all events one of those fresh developments—and this leads one to the conclusion that the degree of the sensitiveness of these cavities is dependent chiefly on the increase or diminution in the numbers of the interglobular spaces.

Bodecker, in speaking of dentinal irritation in the case of ordinary caries, attributes the sensations of pain to "alternate contractions and expansions of living matter" in dentin and enamel, "conveyed from the periphery to the center of the tooth, these intense contractions being induced by highly irritating agencies." But it must be remembered that it is mechanical stimulation alone of the floor of these particular cavities that gives rise to pain; and we must infer, with greater accuracy in the light of our knowledge of the physiological stimulation of nerves and protoplasm generally, that the pathic disturbances are due here to direct impulses, which pass by means of the dentinal fibrils from the protoplasmic contents of the interglobular spaces to the ramifications of the sensory pulp nerves.

The occurrence of additions to the numbers of the long odontoblast pulp-cells does not admit of quite so easy an explanation, and on this question the opinions of those who have worked at this branch of the subject would be welcomed. The American author just quoted has indirectly noticed, although he has not figured this phenomenon. He says: "The first change in the affected pulp-tissue is its reduction to an embryonal or protoplasmic state"—a statement which is certainly not verified on examination of my own microscopic preparations. Further, he writes: "Should the lymph-

tissue be reduced to its embryonal conditions as above indicated, the protoplasm present before transformation into basis-substance reappears, and *may break up into odontoblasts*, or into *osteoblasts*. In the former case, the result of irritation of the pulp-tissue will be *dentin*, in the latter *bone*." The method of thus interpreting the genesis of these lime-bearing cells is crude and illogical.

True bony formations are most rarely found in the tooth-pulp; such a case, however, has been recorded by Messrs. J. F. Colyer and Ackery, but calcareous deposits are exceedingly common. Compact osseous tissue consists of Haversian canals, concentric and intermediary lamellæ, lacunæ, and canaliculi, with blood-vessels, osteoblasts, connective tissue, branched bone corpuscles, and minute lymphatic systems. And if these component parts are non-existent, it is a mistake to pronounce the new formation bone. The local increase in the numbers of the odontoblasts may show that, in certain situations, there is a greater need for the higher and more sustained exercise of their functions, these functions, in my opinion, consisting wholly of shielding the delicate pulp from incoming dangers; not by the production of dentin matrix, but by physiologically creating a larger or more concentrated area of tropic influence or control—if one may so speak—on the surface of that organ, whereby its vitality may be retained until the latest possible moment; or it may be that the odontoblasts have merely undergone cell-subdivision. This is probably the correct view to hold.

(2) Turning, in the second place, to cases in which the dentin is well developed and free from irregularities, the subjective pain symptoms do not, as a rule, appear until there is almost penetration into the pulp-chamber, no matter how rapidly the carious encroachments may take place. But the pulp exhibits similar microscopical characteristics to those already detailed, the most obvious being cell proliferation and odontoblast multiplication with isolated cylindrical dentin formations in the neighborhood of the vessels. Regional hyperemia ("regional hyperemia" is a term used in this connection to denote a localized partial hyperemic condition of the blood-vessels. Thus one may speak of "coronal" or "cornual," "cervical," "radicular hyperemia"—according to its situation) is often present, that is the capillaries and blood-vessels are rather larger and have thinner walls than normal. Pain here is undoubtedly due to lateral pressure on the nerve bundles, the chief factors being the hyperemia

of the blood-vessels, the cellular infiltration of the tissues, and the presence of new dentin nodules. If inflammation supervenes, pain is greatly intensified by pressure on the pulp tissues of the serous exudation from the vessels. It is probable also that pathological changes occur in the axis-cylinders and sheaths of the nerve-fibers themselves. The present research has not yet investigated the changes in the pulp (if any) which may be associated with "zones of translucency" in the dentin, nor in cases in which the caries has undergone spontaneous arrest.

(B) *Conditions associated with Deep Caries.* When, however, caries has advanced as far as the formation of a deep and extensive cavity in the dentin, then fresh structures are seen and must now be described. The odontoblasts at the cervical region are enormously multiplied in point of numbers and layers. The cells themselves are not enlarged, but possess prominent oval nuclei which are much flattened laterally. Interposed here and there are small, hitherto undescribed translucent globules, structureless and non-laminated, but similar in other respects to tiny calcospherite spherules. These are seen at the dentin border between the cells, and sometimes in Weil's layer. At the juncture of the carious region with the primary or first-formed dentin, the latest deposited dentin has at its periphery the globular appearances observed during developmental periods. It takes anilin dyes more deeply than the normal dentin, from which it is highly differentiated. This new tissue may be called "adventitious" dentin—a term which includes several varieties to be hereafter noted. At the place where the carious tubules open into this freshly deposited layer the odontoblasts are considerably shrunken, and pressed inwards towards the pulp. They are disposed in one, or at most two layers, and their peripheral poles (dentinal fibrils) are greatly enlarged and swollen. The layer of Weil is most marked here. Micrococci and bacilli infect the newly formed tubes, and in some places expand them. And where tubular expansion has been effected, there the odontoblasts are absent, their places being occupied by a homogeneous mass of broken-down cells, with a few nuclei scattered about. Intense hyperemia is distinguished by enlargement and tortuosity of the capillaries and arterioles, their engorgement with blood, and emigration of leucocytes. As the thin sheet of adventitious dentin gradually widens out, the odontoblasts become elongated, remaining

all the time in one layer, their fibrils, each with its individual enveloping tube, being of normal size, and stretching across the new dentin at fairly regular intervals. The cells themselves are sometimes gathered into sheaves. With the widening of the sheet of dentin they become smaller and shorter, and diminish rapidly in number until they disappear altogether.

Meanwhile the adventitious dentin presents the well-known appearance of areolation almost identical with that of the interglobular spaces. This areolar adventitious dentin is one of the most commonly recurring of varieties. The tubules which cross the spaces, sparingly filled with round and rod-shaped microorganisms, enlarge greatly as they extend inwards, and terminate with wide mouths at their pulpar extremities. This is probably caused by partial softening of the inter-tubular matrix. The structure of the pulp itself at this place is of the homogeneous character already noted. The dentin which fills the cornua of the pulp exhibits irregular formations, as if deposition had taken place in a hurried manner. Not only are nucleated cells with long processes imbedded in the hard mass, but large lacunal spaces are frequent, each containing micrococci which have entered via the tubules of the primary dentin. In some instances this cellular dentin resembles somewhat the structure of sponge.

A bacteriological survey of the same specimens of hyperemia and early stages of the lesions, which Rothmann has designated "partial acute pulpitis," furnishes one with some valuable particulars as to the probable distribution of the microorganisms in the pulp and surrounding tissue. Miller has isolated, cultivated and named the most important of the cocci and bacilli; here we have an opportunity of describing the probable routes of their invasion of the pulp itself. The microorganisms, after their introduction into the pulp cavity, are believed to make their way in chains, groups, or zooglia masses to the spaces between the odontoblast layer, the dento-genetic and ordinary pulp cells on the one side, and the border of dentin on the other; and also to the interpolar (interfibrillar) spaces, and the intercellular intervals. Thence they travel apparently to the basal layer of Weil, although here they are not congregated in such large or such numerous masses. Whatever their point of entrance, they soon pass to some considerable distance along the line of junction of the hard and soft tissues. Further, they are

found in the substance of the pulp proper, chiefly arranged along the walls of the blood-vessels, in their interiors (when empty) and in the perivascular tissues. Infection of the nerve fasciculi most probably does not take place. The micrococci predominate largely over the rod-shaped organisms. The central and peripheral portions of the adventitious dentin are crammed with microorganisms, but when the odontoblast fibrils with their sheaths cross the areolations of this new deposit, no cocci can be found. From these investigations, therefore, it will be seen that, as a result, one is unable to coincide with Arkovy's theory of the phagocytic function of the odontoblasts. They certainly possess a granular appearance, but a search for any microorganisms which have become incorporated in the substance of their protoplasm or nuclei is attended with negative results.

If the course of the disease is progressive, inflammatory foci appear. These consist of proliferated connective tissue cells (macrophages), pulp cells, and mono- or poly-nuclear leucocytes which have escaped from the numerous enlarged capillaries, all having been attracted together by a kind of positive chemio-taxis. The foci are very pronounced, commence at first in one or both of the cornua of the pulp opposite the carious dentin, and as a rule ultimately suppurate and form localized abscesses. Rapid destruction of the pulp ensues, and the undermined dentin finally gives way in the majority of cases. Sometimes a certain amount of fibrification of the cells lying in the immediate vicinity of the abscess occurs, and what might be termed a rudimentary abscess sac is developed. We are led to believe that this specialization and grouping of spindle cells is not merely fortuitous, but a deliberate attempt on the part of the pulp to heal the lesion. The condition is observed in cases of chronic caries, the adventitious dentin being then deposited in layers, and presenting a characteristic fibrillar structure. On the borderline of the hard and soft part, the connective tissue structure of the dentin matrix is well brought out. Islands of dentin in the body of the pulp suggest that they are simply calcified bundles of connective tissue fibers mixed with cells; the process of formation being analogous to that of intra-membranous ossification of bone.

(C) *Conditions associated with Penetrating Caries.* Limitation of time affords these notes opportunity of speaking of no more than two phases of one of the commonest conditions found in the mouth,

viz., idiopathic exposure of the pulp. In median sections of teeth affected by acute caries, which has terminated in total inflammation and partial suppuration of the pulp, it is obvious that the cells appear degenerate altogether. Connective tissue cells are broken down; the pulp cells have become changed into indifferent cells with large square nuclei, and escaped leucocytes crowd the tissues. Even the odontoblasts themselves at the cervical region are metamorphosed into short cells with rounded nuclei, and at the coronal part are opaque, and seem to have undergone fatty or mucoid degeneration. Finally, at the periphery of the pulp the small globular deposits already mentioned are found. The nerve bundles have lost their definite structure, and though retained in position are evidently less translucent and more disorganized. There are no clear evidences of fatty degeneration in the sections under notice, although Wedl describes this as existing in his sections of acute purulent pulpitis. The tissues are greatly condensed at the margins of the abscess cavity, the cells being short and fusiform, interlacing closely with each other. The blood-vessels are hyperemic, and micrococci and bacilli are abundantly distributed throughout the tissue.

The last condition which we shall now consider is that of a phase of acute partial suppurative inflammation of the pulp, in which that organ has been subjected to the devitalizing action of arsenious acid for a period of not less than twelve hours. In addition to appearances which denote the intensity of the inflammation—hyperemia, marked cellular infiltration, suppuration and other changes common to acute inflammation in soft tissues—a prominent feature is a large special form of dentinal deposit which is situated at the base of the carious opening into the pulp-chamber. It is irregularly rounded in shape. Its structure, in some places, is that of a more or less homogeneous matrix closely resembling that of hyaline cartilage, in other places it has a distinctly fibrous character. Distributed throughout, and with no attempt at uniformity of arrangement, are rounded or oval spaces containing one or more cells with large round nuclei. The cells vary considerably in size, those near the pulp side being six or eight times as large as the smaller ones near the dentin sides. Towards the pulp side rows of encapsuled cells exist, some being multi-nucleated. The surrounding pulp tissue in immediate association with the new deposit consists chiefly

of fusiform cells arranged in bundles interspersed with small round cells, the former possessing oval, and the latter round nuclei. This particular form of cellular or hyaline adventitious dentin does not occur solely in acute inflammations of the pulp, it is also seen in chronic inflammation with hypertrophy (polypus) near the lower portion of the pulp cavity. In this case it may be accompanied by new dentin which has a pronounced laminar structure. In conclusion, a preliminary study of the patho-histology of these lesions leads one to the following deductions: (1) That nearly every degree of dentinal change is attended with hyperemia and cell proliferation in the pulp tissues, and generally speaking, the formation of adventitious dentin. (2) That the latter may have its origin as a conversion or secretion of the dento-genetic cells, producing on the one hand the areolar or laminar or hyaline varieties, when the formative cells alone happen to be concerned; on the other, the fibrillar or cellular forms when odontoblasts or connective tissue cells are by chance incorporated in the deposit. (3) That there are no proofs that the cells called odontoblasts take any part in the production of the matrix of the new dentins, the term being therefore a misnomer; and (4) That the new dentins, by a system of extension from the affected areas, may be just as much subjected to the peptonizing action of microorganisms as the primary dentin of the tooth.—*British Journal of Dental Science, May, 1897.*

THE LINGUAL TONSIL should be examined in instances of hemoptysis which are not explained by the state of the respiratory organs.—*The Laryngoscope.*

CANCER OF THE PHARYNX commences in 60 per cent of cases on the surface of the tonsils, and, as it causes little trouble in its early stages, is very apt to be overlooked.—*Watson Cheyne.*

BARBERS SHOULD BE COMPELLED TO BOIL THEIR INSTRUMENTS.—Why not? asks the *Union Med. du Canada,* commenting on a recent case of staphylococcus infection contracted by a physician in the barber's chair. Why should there not be a municipal regulation to that effect?

DISTINCTIONS BETWEEN HUMAN AND ANIMAL BLOOD.—On mixing the blood in question with a little bile, there are formed crystals not exceeding 0.003 metre in size. Those of man are right rectangular prisms; those of the horse, cubes; of the ox, rhombohedrons; of the sheep, rhombohedric tablets; of the dog, rectangular prisms; of the rabbit, tetrahedrons; of the squirrel, hexagonal tablets; of the mouse, octahedrons; of common poultry, cubes modified at their angles, etc.—*Scientific American.*

Letters.

REPLY BY DR. EDWARD C. KIRK.

PHILADELPHIA, June 20, 1897.

To the Editor of the Digest,

DEAR SIR:—I note in your May issue a criticism upon the editorial management of the *Dental Cosmos*, for what you deem an inconsistency with respect to its attitude in relation to plagiarism; and in defense of the charge which you make of editorial pilfering you cite a portion of a report which appeared in the *Cosmos*, wherein a method is given which had previously been described at length in the DIGEST. You also quote certain editorial statements from the *Cosmos* which seem to you to have a bearing upon the case in point.

The charge of plagiarism in this case must rest solely upon the similarity of the ideas presented, as the language in which they are set forth is in no degree similar. It could not be otherwise, for the reason that the wording of the *Cosmos* report is that of our reporter, who was present at the meeting and who had no knowledge of the prior publication of the same method in another journal. As a matter of fact, neither had the editor until after the *Cosmos* report was published. If, therefore, the case is one of plagiarism at all, the responsibility rests solely between the two gentlemen who have each given the same method to the profession through different channels.

As an editor you will doubtless agree that it is beyond the limits of editorial possibilities to establish questions of priority in all cases where ideas are offered for publication; even the patent office fails frequently in that regard; and you will easily see that the case in point is entirely different from the one which gave rise to the editorial in the *Dental Cosmos* for November, 1896, from which you quote, the difference being that in that case a verbatim literary steal was under criticism. Further, I may perhaps be permitted to add that there was no intention of casting any reflection upon your valued journal in the quotations which you have made and which, upon critically reading them from that viewpoint, I fear might have been an allowable inference.

Now with regard to your anonymous "Quaker" correspondent. The pathological condition manifested by his effusion is one which presents an interesting and somewhat complex clinical picture. A

study of the symptoms, however, will enable anyone familiar with the disorder to at once recognize it as a case of *megalocephalitis*, that is to say, a chronic case of big-head, complicated with an intercurrent attack of sore-head. It is not, as has been suggested, a condition which would yield to a course of treatment with Lydia Pinkham's Famous Vegetable Compound, for the disease is quite incurable, running a chronic and very irregular course which invariably terminates fatally. EDWARD C. KIRK.

ECHOES FROM MISSOURI.

ST. LOUIS, MO., June 2, 1897.

To the Editor of the Digest,

DEAR SIR:—In compliance with my promise recently made to you, I will now try to give you a little news from our city. The St. Louis Dental Society held its regular meeting on June 1, and while the attendance was small the meeting was enjoyed by all present. One new member was elected and two recently elected signed the constitution. The most entertaining part of the program was a paper on "Pyorrhea Alveolaris," by Dr. Emma Eames Chase. The discussion of which, together with the question on the same subject submitted by the committee of American Dental Association, consumed the time of the society until adjournment.

It has been the custom of the St. Louis Dental Society heretofore to let the meetings for the months of July and August go by default, but the July meeting will be held this year, at which time the discussion of the remaining subjects submitted by the American will be taken up.

Just now the subject most talked of by the profession is the coming state meeting, and we are anticipating one of the best meetings in the history of the society. We extend an invitation to all of our professional brethren of Chicago.

As you are doubtless aware, "poor old Missouri" has at last succeeded in passing a dental law, creating a board of dental examiners. The governor has appointed the following gentlemen on the board: Dr. Ruby, for 5 years; Dr. Bartlett, 4 years; Dr. Burkhead, 3 years; Dr. Jenkins, 2 years, and Dr. H. S. Lowry, 1 year. These appointees will organize at once and be ready for business on June 20, at which time the law becomes effective. Certainly the gov-

ernor should be congratulated on his appointments, for no more capable or worthy men could have been found in the state.

Yours fraternally, MISSOURI.

ST. LOUIS LETTER.

ST. LOUIS, June 19, 1897.

To the Editor of the Digest,

DEAR EDITOR:—The most important news I have to send you today is that it is uncomfortably warm in our city just now, and that we are all very busy getting patients ready to leave dentists out of their calculations for a few months. We now wonder how we ever lived through this busy, hot month before the day of electric fans, to say nothing of other comforts, such as electric motors for our engines, fountain spittoons and window screens, which all help to make the dental office endurable in hot weather.

We do not see much of the other dentists, but we did see "the only Mac" the other day, looking just as provokingly cool and fresh, all in lavender and white, as he does at the American in August. We must tell you where we saw him—for you will never guess—we found him at church last Sunday morning. Just as young as ever, too, for he was comparing fans with one of the young ladies in the vestibule, until her father ushered him into the front pew.

We are all envying our expert orthodontist, who soon sails to spend the summer in England. He made such a good impression when he was in London last year that the leading English dentists want him to come again and take charge of certain difficult cases for them. Many of us feel just a little uneasy about his trip this year, for having experienced the relief of being entirely free from these cases of orthodontia, we do not enjoy the prospect of being obliged to resume this part of practice, as we will be obliged to do in case our good friend is persuaded to remain in London.

While we still had visions of the briny deep, with England cool and green in the distance, here comes our cheerful (and persistent) treasurer of the St. Louis Dental Society, to tell us that he is going to California for the summer and will take his family with him. I mention this latter fact because dentists usually take their outings without their families.

We are all counting on the little outing we will have at the state meeting at Pertle Springs next month (July 6 to 9 inclusive). The com-

mittee promises us a good program, we are sure of as comfortable a place for our meetings as can be found in the state, a goodly proportion of the best men from all over the state always turn out for our state meeting, and some of the good fellows from the neighboring states always attend, while we are glad of such a good excuse to get out of town in July even for a few days. We hope you will send a large delegation from Chicago.

Our new dental law is about to go into effect (June 20), and while some of the kickers object to it because it is not perfect, there is a general feeling of satisfaction that we have made a start in the right direction. The editor of the *Western Dental Journal* voiced the sentiments of the majority of the best dentists of the state in his able editorial in the April number of that journal, as was shown by the vote of thanks for that expression sent the editor by the St. Louis Dental Society at their meeting in May.

At the June meeting of the society the first of the questions proposed for discussion by the committee of the American was taken up and discussed. Mrs. Emma Eames Chase gave a brief resume of the theories advanced and definitions given by our leading writers, and the subject was discussed by Drs. Prosser, Conrad, Bartlett, Fletcher, Kennerly and others. There was the usual difference of opinion concerning the curability of the disease; the usual statements of cures by some, and the customary doubts of such statements by others. Those who doubted were advised by Mrs. Chase that they were much more likely to see the failures of other dentists than the cures, and one should not base an opinion on that alone; and that since reputable men in the profession did say that the disease is curable, it was only fair to give them credit for curing some cases; and to go to work to find out how it could be done. Hoping to see you at Pertle Springs,

Yours truly, ST. LOUIS.

BALTIMORE LETTER.

BALTIMORE, June 16, 1897.

To the Editor of the Digest,

DEAR EDITOR:—Your kind invitation to drop a few notes is just a little more agreeable because you consent to let me make the noise from a position concealed. I am a shy bird and you must not tell anyone that my plumage is black and orange.

The business meeting of our State association was held Tuesday night last and it was pleasing to those interested in professional matters to note that the attendance was large. A few years ago it was hard to get a respectable number together at such a meeting. About a dozen new members were added to the roll, and these with other recent acquisitions will infuse new blood, which when mixed with the old stock we hope will produce a vigorous and sturdy association. Some of the officers elected were old stagers, but quite a number were untried men put forward by a clique, which has recently organized under the leadership of a gentleman who has developed a penchant for politics. Of those elected at least three—the two vice-presidents and the treasurer—were at the Old Point meeting (vice and money are sometimes associated here, too). The rest of the officers, especially the executive committee, will, we hope, be present at the next meeting, as it will probably be held in Baltimore, when we will have an opportunity to entertain our friends from Virginia and Washington.

A committee was appointed to secure a revision of our dental law. Maryland is one of the few states which as yet has not a perfect dental law. She has, however, a pretty clean record in examinations by the dental board, forty-two having been examined this year and forty-two passed and were licensed to practice. The examinations were oral and made to include for the first time graduates of Baltimore schools. Some of those examined say the questions were of a rather elementary character, so it is expected that the board is just trying its wings this year; next year we hope for written examinations and that the sieve will have a little closer mesh.

The applicants for right to practice medicine were not so fortunate as their dental brethren; out of ninety-seven applicants, fifty were rejected. The examinations were written and each applicant was required to sign a statement that he had not received nor given aid. In spite of this, it is reported that compends and even books as large as Gray's Anatomy were consulted freely; that men crawled on all-fours for several seats so as to exchange papers with friends; it is hinted that at least twenty-five men were involved in failure by this proceeding. Some of those thrown were honor men in recent classes of reputable colleges, and those interested are much disturbed by the matter. The medical colleges have always taken a lively interest in legislative procedures, and it is expected that some compro-

mise will be effected, or an appeal will be made to the legislature for relief or modification of power. There may have been some hasty judgment in this wholesale slaughter, but the fact remains that a proportionately large per cent of those desiring to enter the medical profession were suspected of or detected in cheating.

It has been claimed, if not commonly believed, that professional men have a moral tone somewhat above that of the average business man—why? Is it because a better class of men aspire to these callings? In the light of this recent expose I hardly think so. Is it not rather that years of training with those who have acquired a deep and intimate sympathy with human nature enable them to imbibe some of the nobler and holier traits of human character—an argument for fraternity—or possibly a multiplied presence at the mounting of the pale horse may soften and repulse the brutal and criminal instincts of man's nature.

It would seem if practicable that all professional schools should make more of the teaching of ethics; some have claimed, I know, that the schools and teachers have nothing to do with the morals of students; but wherever the student goes he certainly represents his alma mater, and where a low moral tone prevails among the students the reflection is inevitable. With extension of the term of study, opportunity for time to be spent in ethical training and cultivation of the professional sense will not be lacking; indeed, I would make the signing of a code of ethics a condition of matriculation.

Dr. De Trey, of Basel, Switzerland, who cliniced at the New York Odontological Society last week, is expected in Baltimore, where he will probably give a clinic with the new form of plastic gold suggested by his father. More anon, OREOLE.

LETTER FROM THE NORTHWEST, AND CURSORY REPORT OF THE MEETING OF AMERICAN MEDICAL ASSOCIATION.

DULUTH, MINN., June 22, 1897.

To the Editor of the Digest,

DEAR DOCTOR:—Aboard the Journal Special, Chicago to Philadelphia in less than twenty-four hours, cool air; no dust; surrounded by friends, all happy and full of laughter; good stories and merry talk, assisted by complimentary contributions from Mumm & Co. and other manufacturers of good wines and liquors, which were dis-

pensed freely to any who would so much as touch the button, "without money and without price." Yet, by reason of this very freedom, no excesses to mar the general pleasure. Such in brief was the journey from the West to the Golden Jubilee of the American Medical Association upon its fiftieth anniversary meeting.

As for the four days of regular session, probably no one ever saw so much hard scientific work and so much festivity within the space of ninety-six hours. Truly the spirit of the modern Quaker is easily moved, and his eye color blind, so far as the formally offensive vermillion is concerned; but these symptoms of latter-day degeneracy, so called, are more than offset by a royal hospitality and we see him in his glory as a host.

Lunches at the Union League Club, the hospitals, hotels and colleges. A choice of several every day, with dinners in proportion for the members; receptions in prominent places by eminent and hospitable people, including their ladies also; while the ladies of Philadelphia made up a program for the visitors of their sex that embraced every subject of interest in charming old Philadelphia, from trolley rides, art and literature to entertainment by the Colonial Dames, or golf and cricket clubs.

Atlantic City, not to be outdone, took charge of the visitors for a night and a day; board, lodging and everything of value or entertainment in that resting place for the weary by the sea was free to wearers of the button. Even "Streets of Cairo," and other Board-Walk shows opened wide their doors, and, as if to crown all other efforts in this lavish program, the Broad Street Theater, filled from pit to dome with doctors, their wives and lady friends, was indeed a sight never to be forgotten, while the happy reception given the artists chosen to entertain that vast company by Lea Brothers, whose guests the Association members were for that evening, must have fully gratified the highest expectations of all concerned.

Now to our friends the dentists and their section. In lieu of the customary section dinner the dentists of Philadelphia gave a banquet at the Continental Hotel, at which about sixty entertainers and their guests, with wine, wit and the good things for which their city has long been famous, passed the evening most pleasantly.

To enumerate the hosts would be like beginning to call the roll of honor of the dental profession. Who cannot name them? The toast-master, in political parlance the logical candidate, was Dr.

S. H. Guilford, who in his usual happy way introduced as speakers Drs. R. R. Andrews, of Cambridge, Mass., E. T. Darby, James Truman, Wilbur F. Litch and C. N. Peirce, of Philadelphia, E. S. Talbot and J. S. Marshall, of Chicago, G. F. Eames, of Boston, and George V. I. Brown, of Duluth.

What did our section do? It kept in point of attendance, scientific character of papers and interesting discussions, fully abreast with other sections, and was pronounced one of the best.

The paper of the chairman, Dr. R. R Andrews, touched upon the use of X-rays and other matters of interest, and brought as its central idea the importance of societies making a united effort to have municipalities require examination of mouths of school children, with a view to their treatment in the interest of general health.

Dr. W. G. A. Bonwill's paper contended that the laws of osmosis precluded the possibility of the passage of cocain through dentin, as is claimed by advocates of cataphoresis, and called attention to methods of his own in the management of patients.

Dr. Eames, of Boston, brought out lively discussion by touching upon the old-time topic—Relation of Medicine and Dentistry—which he, however, handled in an original and interesting manner.

Dr. G. Lennox Curtis, of New York, made a plea for conservative oral surgery, urging the preservation of periosteum whenever possible, and gave some interesting illustrations from his practice.

Dr. Talbot, of Chicago, read his paper, number four, on pyorrhea alveolaris in mercurial and lead poisoning and scurvy. An accompanying list of photo-micrographic illustrations added interest to a carefully prepared paper, and, needless to say, thorns were not removed from the brows of advocates of the uric acid diathesis theory.

Dr. Talbot also entertained the Stomatological Club of Philadelphia by a lecture on the stigmata of degeneracy, with stereoptican illustrations.

Dr. Wm. Knight's (of Cincinnati) paper upon tumors of the maxilla was one of absorbing interest, as were also a series of clinical cases along the same line by Vida A. Latham, of Chicago, with photo-micrographs showing sections of the growths described.

Dr. Geo. V. I. Brown, of Duluth, dwelt upon hyperkinesis of the muscles of mastication as a symptom and an etiological factor in nervous affections, particularly neuralgia of the trigeminus and diseases of the jaws.

Dr. Edward Branigan, of Boston, touched upon dental faculties in medical schools in a manner possible only to one of widespread experience in these institutions.

Dr. Geo. T. Carpenter, of Chicago, in addition to an interesting paper, presented photographs showing very excellent results from harelip operations.

Dr. W. E. Walker, of Pass Christian, Miss., advocated sterilized roots of beasts' teeth as supports for porcelain crowns.

Many papers full of interest it is impossible to notice as they deserve. Drs. Litch, Truman, Stellwagen, Peirce, Kirk and other Philadelphians took an active part in the discussions, while Drs. Marshall and Baldwin, of Chicago, Fletcher, of Cincinnati, Williams, of Boston, Gillette, of Newport, and other visitors gave ample expression to outside opinions.

The following officers were elected for the ensuing year: Dr. Geo. V. I. Brown, Duluth, chairman; Dr. E. S. Talbot, Chicago, secretary. Executive committee: Dr. J. L. Williams, Boston, Dr. M. H. Fletcher, Cincinnati, and Dr. A. E. Baldwin, Chicago.

The next meeting place decided upon was Denver, and all are cordially invited to taste of their truly Western hospitality.

Yours, etc., GEORGE V. I. BROWN.

NEW YORK LETTER.

NEW YORK, June 19, 1897.

To the Editor of the Digest.

MR. EDITOR:—We are disposed to emphasize the stirring events now occurring in New York, as regards the defeat of a bill to remedy the supposed evils of the prevailing system of conducting hospitals and dispensaries. This defeat has so aroused the ones favoring the bill that things are approaching white heat, this matter is so nearly akin to our interests. We predict that the wisdom which does in some measure abide in the minds of men will sooner or later find expression. We would like to reproduce the letters given to the public press, but they are too voluminous. The following, however, is a fair sample:

Dispensary Abuses a National Issue. A Physician Says the Movement for Needed Reform is Really International in Character, but Objects to the Retroactive and Unconstitutional Laws.—The Medical Charter bill, which Governor Black very properly refused to sign, would have given the State

Board of Charities Commissioners absolute authority in all matters pertaining to this vexed question; for instance, they would have the power to take away the charters of institutions already existing, well organized, equipped and carried on, and with sufficient monetary guarantees for the future, such institutions having been duly incorporated by act of the legislature. Such a measure would be retroactive, and retroactive laws belong to the Dark Ages. It would out-Herod Herod, to say nothing of interfering with constitutional right. And, as regards the creating of new hospitals, dispensaries and clinics, it would be under the absolute control of the board, and that savors of the star chamber again. Organization there ought to be. Granted. But let it be simply organization—a supervision of all such institutions by the State Board of Charities or other board or committee appointed partly by the state and partly by the city, whose duty it shall be to inspect all hospitals, dispensaries and clinics to see that they are properly carried on, that their financial condition is sound and that none but the poor be furnished medical advice and treatment gratis, pay wards and private rooms being set apart for those in better circumstances. This could be done, and it could even be pretty accurately ascertained in the great majority of cases whether applicants are really deserving or not, without going into a regular system of espionage.

This editorial of the New York *Herald* is so full of suggestion that we venture to insert it:

The Medical Charity Abuse.—The discussion of the question of the prevalent abuse of medical charity as connected with the dispensary system has brought out many interesting facts. From what we can learn both parties to the controversy—the medical staffs and the boards of management of these institutions—are equally to blame. The doctors, in their eagerness for clinical material, are inclined to treat all interesting cases indiscriminately, whether able to pay or not, and the managers are anxious on general business principles to make a good showing for the institutions under their charge.

No one doubts the fact that the majority of patients treated in the dispensaries are able to pay the physician a legitimate fee, and are consequently undeserving applicants. It is also true that the dispensaries are too numerous—are out of all proportion to the actual needs of the really poor patients, and are slowly and surely fostering a most dangerous form of pauperism. London is suffering from the latter condition and New York is falling into the line of its bad example.

The dispensary bill of Mr. Sullivan was well calculated to effect a compromise between the chief parties in the dispute, but its failure to become a law by the governor neglecting to affix his signature leaves the matter where it was before and renders nugatory the best directed efforts of judicious legislation. The medical profession was practically unanimous in favor of the bill, but the managerial boards offered their opposition to the curtailment of time-honored privileges.

In view of the present situation the proposition to place the control of the dispensary system in the hands of the State Board of Charities was worthy of a trial

it has been shown by the past that cultivation tends to corruption, doubtless on the theory that "He that increaseth knowledge increaseth sorrow." It is from the center that man must ascend to higher grades of usefulness, not from the head.

To entertain for a moment any doubt that there have been and are now great evils directly traceable to undue influence in our schools is useless, and recently the press has shown the public that the large amount of smoke indicated some fire. Whether this fire is still smoldering and liable to again break out we know not. Rumors are afloat that all will be peaceful soon, for a new deal is on.

Have we men that are capable of doing justice to students over such a large field of instruction? Sooner or later the test will come to our associations and they will call a halt, for we cannot go on as we are. It will be the top against the bottom; surely neither can be right that permits the necessity of investigations, yet we must use all the charity possible, for it is the outcome of all growth. Never has there been such a call for wisdom.

We have had unparalleled advancement during the last thirty years. The beginnings of associated fraternal gatherings, which were of an unusual character, were fostered by that big-hearted man who carried all his followers with him in spite of themselves. Those of us who were in it know this. We gave our best bounteously. Some thought New York would never coalesce. Few of these changed their ideas, but the warm-hearted, large-brained Atkinson will live on in the years to come, and when the most of us are gone the younger practitioners will study the archives of this age and marvel that we built so well, even better than we knew. Time is the righteous judge of history, and credit will be placed at the door of him who does nobly and unselfishly.

We think there are decided indications of a move towards the organization of a new national body of dentists. We hear of it in and around "Greater New York," which of course includes not a little of New Jersey, certainly the dental part of it. It is not very difficult to note the trend of things among the hornets; just where they will hive may not be our province to predict, but that it will be early in the season admits of no dispute, and this before going South. Wisdom is in the higher altitudes, at least a good place for consultation and the counting of thumbs, so that they will be up at the right time. This movement is not going to be on regular "trade" lines.

The medical gentlemen in arms, and why not? So say some 3,000 medical practitioners; yet we think that the course pursued to secure legislation for the supposed grievances can bring about the results desired. We think very much the same question is involved as that which has created the vexed state of things between capital and labor—neither party is wholly right, and neither party wholly wrong. Too much power generates too much of what sooner or later becomes oppression. Charity in dispensing medical service can be regarded only as a righteous act. Now to undertake to remove the management from a judiciously selected body of medical men would be a very unrighteous act, and a gentleman of the standing of Dr. St. John De Roosa takes high ground in his stern defense. We see in the situation a feeling akin to what we mentioned in our last letter—a feeling of unrest generating among dental practitioners, which is laid at the doors of dental schools and the excessive legislation, creating, as it has, a spirit tending towards commerce at the expense of true professional dealings. This is manifested by the rapid increase of pretentious offices, which are encroaching on our leading thoroughfare, Broadway; previously they have been confined to the avenues east and west. In these places no names appear, but we are informed that the operators are readily secured from the graduating classes of the colleges. Is there any way out of such a dilemma? We do not see how the schools can keep their graduates from assimilating the commercial spirit, when the atmosphere is so fully charged with it.

Words have unfortunately been uttered and printed in our journals that have not had an elevating tendency. They may have been said thoughtlessly, but they have been said. "There is more money in other callings than ours," and discouraging remarks of varied nature. But in spite of this, not a few have heard of the incomes of practitioners of from three to twenty thousand dollars per year, and so many young and ambitious men seek a quicker road to fortune by a commercial manner of doing things. It has been truly said in defense of the present system of medical charities, that overeducation of students for practice now, more truly means undereducating of students in the past by easy-going ways of securing certificates. It is hoped by some that raising the standard will ultimately tend to decrease the inferior grade of practice and practitioners. It would seem that it should do so, but we fear not, for

ber of our fraternity had a brain he had, and more, a heart which had the control of it. We could detail not a little proof from personal experience. Dr. S. S. White had a history that will some day illuminate some of the dark shadows that hovered over him, which only a few of those truly familiar with the origin of them understand. Such is the legacy of every noble and generous life; without them we could not know the beauty of light and shade.

A special Dwinnelle clinic was held at the rooms of the Odontological Society June 15 and 16, for the demonstration of the "Solila Gold." Dr. Victor de Trey, of Basel, Switzerland, attended to the task in a very satisfactory manner, much to his credit as a skilled operator. He will be a unique attraction at the coming meetings of the summer, as he told us he comes for the purpose of giving an exhibit of the qualities of the gold. We are convinced that it is a very valuable addition to our calling. It has a decidedly plastic quality.

Cordially, NEW YORK.

"MADAM, can I sell you this valuable book, 'What to Do Before the Physician Comes?'"

"No, sir; you don't catch me doing the work and then letting the doctor draw the pay."—*Iowa Med. Journal.*

FOOD OF THE ANCIENTS.—In the very ancient skulls of Egyptian mummies the teeth are generally found greatly worn on their masticating surfaces. This, together with the absence of decay, evidences the possessors must have lived on food that required a deal of mastication.—*Medical Age.*

DENTISTRY A VERY ANCIENT PROFESSION.—A floating clipping has reached us that Dr. Geist-Jacobi, of Frankfort, Germany, has written a history of dentistry from 3700 B. C. to the present time. According to this it is known that there were men practicing the profession of dentistry in Egypt at least 5,000 years ago.—*Jour. Am. Med. Assn.*

BUG IN THE EAR.—A daily newspaper report tells of a wonderful "operation" for the removal of a bug in the ear, with complete restoration of hearing. Dr. Burnett in a recent article (*Practitioner*) upon foreign bodies in the ear says much damage may be done by groping after foreign substances, especially when there is none present. No one but a specialist, he thinks, should ever attempt instrumental extraction. If a living insect has entered the ear, a few drops of sweet oil will smother it and it may then be syringed out with warm water. Syringing will also usually remove objects introduced by children. No hurry is demanded. Delay is better than rough handling. Death has occurred from unskillful endeavors. If larvæ of flies are present, as sometimes happens in the tropics, a drop or two of chloroform or ether will destroy them.—*Med. Record.*

This reminds us that reduction is in the air, and we are glad of it, if, as so much said, "the times are fearful." We notice ten-dollar shoes in the windows for three dollars. Rents are about the same—always too high for dentists—and as to clothes, full suits can be purchased for $6.75, so Uncle Russell says. Who could not live on Fifth avenue and dress well for that sum? We believe that if any class of men should dress well and in good taste, it is the dentists. Not a few of them carry along a dress-suit case in their journeyings, and they look well.

We give the following from the New York *Herald* of June 9:

Judge Bookstaver Dismissed Miss Hughes' Suit against a Dental College. —She had sued for damages to several of her teeth, due entirely, she says, to clumsy work on the part of some student operative. Loss of her teeth entailed loss of clearness in articulation, she said, and, as she is an actress, she could not earn money.

Experts testified that if the roots of two teeth were fastened together in what dentists call "ankylosis of the teeth," it is impossible to pull out one without extracting the other. Other experts testified that loss of teeth did not entail loss of voice or articulation.

A juryman went to the college's counsel and whispered: "We would have decided against Miss Hughes. Why? Because people who have money enough not to go to an infirmary tempt danger in going there." Judge Bookstaver's decision was based, practically, on a similar idea. He said: "The printed notices on the walls of the college's reception-room, the printed notices on the cards which applicants for service receive, instinct and reason, agree in attributing to students, not professionals, the work done in a college of dentistry."

Judge Bookstaver allowed costs and an extra amount to the college, making Miss Hughes' expenses for her suit about $300. Her friend, Miss Brazeel, said to her, "My dear, never mind. Soon, whether you lose or win your case on appeal, I shall sue the college. And the dentist who was the defendant's witness in your suit will be the plaintiff's in mine. He told me that the work which the college did for me was inexcusable."

The above can hardly be viewed in the light of a joke, although it has been testified to by so-called experts that the breaking and taking out of two teeth, instead of one, often occurs in the hands of skilled practitioners. What will the public say to such statements? Newspaper education flies at a rapid pace in these days. What is our redress? Why, combat it only by honest service every time, for "a pleased patient is the best 'ad.' one can have."

We have heard from a number of prominent medical men and others of Philadelphia that Dr. S. S. White's brain occupies a place in the museum of the Anthropological Society. Surely if any mem-

The Dental Digest.

PUBLISHED THE

TWENTY-EIGHTH DAY OF EVERY MONTH.

Editorial.

POLITICS AND THE ILLINOIS STATE BOARD.

It has long been argued that politics should play no part in choosing the State Board of Dental Examiners, and this last appointment by Governor Tanner furnishes overwhelming evidence of the truth of this statement.

While we have no desire to criticise the appointees personally, and attach no blame to them for being on the board, as the honor may have come unsought, we cannot but deplore the Governor's choice. Only one of the five men, Dr. J. H. Smyser, is a member of a dental society. The letter-head of one member would debar him from membership. Three are comparatively recent graduates, and there is a doubt as to whether one has ever graduated from any dental college. They are men unknown to the profession in Illinois, as well as outside the state.

It seems hardly right and proper that such men should have the power to sit in judgment upon applicants for license to practice. Appointments of this kind serve only to bring the profession in Illinois, as well as the state board, into bad repute, and the standing of the entire dental profession is lowered thereby in the eyes of the community.

ANSWER TO THE DENTAL REVIEW'S CRITICISM.

The editor of the *Dental Review*, in the June number of that publication, takes us to task for printing papers read before the Chicago Dental Society, which appear at a later date in the *Review*, and endeavors to show that we are inconsistent when we accuse other dental journals of plagiarism.

To quote from this editorial: "The DIGEST itself secured a copy of the paper from Dr. Freeman and published the article without authority or privilege, and in face of the stipulated rule of the Chicago Dental Society that papers read before it shall be published in the *Dental Review*, etc." The "stipulated rule," enacted Dec. 7, 1886, says that "The *Dental Review* and any other respectable

journal may have the privilege of making a report of the society's proceedings for publication." We published these papers because there was so much of value in them that we thought the profession outside of Cook County should have the benefit of it.

We were not aware that the Chicago Dental Society was run in the interest of the *Dental Review*, or that papers were read and discussed before it to fill the pages of that journal, however much in need it may be of such matter. In fact, we did not suppose that the society was conducted to keep alive any dental journal, much less the catalogue for a dental supply house, under which head the *Dental Review* must come, since over half the advertisements in its June issue are those of the dental supply house by which it is published.

The *Dental Review* has fallen down and been left behind, and instead of endeavoring to keep up with the progress of the times, it is engaged in the ridiculous and undignified task of publicly rubbing the sore spot.

AMERICAN DENTAL ASSOCIATION.

We would urge all who can possibly do so to attend the meeting of the American at Old Point Comfort, Va., beginning Tuesday, August 3, 1897. The railroad arrangements have been completed, and all passenger associations except the Western have given a rate of a fare and a third for nine days. The Southern has made a rate of one fare. These rates are of course on the certificate plan and a receipt must be taken when ticket is bought.

The new hotel, the Chamberlin, is well suited for our purpose. All meetings will be held in the dancing-hall, and there are large rooms on the same floor for committee meetings. A rate of $2.50 per day for each guest has been made.

An interesting feature of the meeting will be the collection of comparative dental anatomy, which will be shown in the section of Anatomy, Pathology and Surgery. It will include specimens, skulls and skeletons in all the classes, orders, and most of the species of the Vertebrates, and very many of the Invertebrates. Also a large number of fossil dentitions, including those of birds of the Tertiary Age, the Reptilia of Mesozoic time, and Fishes of the Devonian Age. It will be especially rich in specimens of Homo, and will include many pathological specimens, both of man and the lower

animals. The exhibit will fill a large room and will probably be the finest ever gotten together. It will do great credit to the Association and to those who have assembled it.

QUESTION OF PROCESS PATENTS.

Regarding the discussion of the subject of "Process Patents," and the somewhat extended paper appearing in the editorial pages in the June number of *Items of Interest*, over the signature of Rodrigues Ottolengui, formulating a certain proposition which is syllabused as follows: "The profession should now unite in a request to congress for the passage of a law prohibiting the granting of any patent upon any method or process of treating or curing human diseases or ailments"—and the complimentary reference to the opinion of the chairman of the Dental Protective Association, and prominence given to such opinion relating to this subject, we desire to briefly reply thereto, more by way of explanation than of contradiction.

The question of process patents, so far as mechanical processes are concerned, has recently been definitely decided in this country by the Supreme Court of the United States, that court having put an end to the legality and validity of all patents upon mechanical processes in all the arts and industries, which, of course, would relate to any mechanical process patent having any reference to the practice of dentistry. This case is known as the Risdon-Medart case and is reported in the 158 U. S. 72.

We quote from the decision of that learned jurist, Judge Wheeler, given on the Low Bridge patent, and published in full in the April, 1896, issue of the DIGEST. He says: "When the method, and not the operating parts, is what is invented, that, of course, is what is to be patented. Here the natural teeth belong to the wearer, and are to be operated upon; they are not made by the inventor to operate, and cannot be brought within the patent."

The sentiment of the editorial is undoubtedly correct. There are now and have been for generations past, three learned professions, briefly identified as divinity, law and medicine. Closely following the learned profession of medicine is that of dentistry, which in late years, by means of the colleges and wide literature, and long years of study and preparation for its practice, has, as a matter of fact, risen to the dignity of one of the learned professions.

Patents are not taken out in this country relating to the evangeli-

zation of the earth, or the salvation of souls, neither regarding the practice of law, and but few patents have ever been taken out, to our knowledge, and asserted in the courts relating to the amelioration of human sufffering or prolongation of vital forces. Charlatans, professing to represent the profession of medicine, have, of course, taken out patents; but they are charlatans, are known as such, and but few of them can exhibit the necessary credentials which authorize them to apply the title of M.D. to their signatures.

It would seem to us that correct results could be arrived at, from the standpoint of conditions and not theories, by a congressional enactment to the effect that no member of the medical or dental profession shall be liable as a *user* for the infringement of any patent. That is, exempt physicians and dentists from liability of any character or description from the use of any mechanical device in the practice of their profession, or from the use of any composition of matter protected by a process patent in their practice.

The law, as it now stands, permits the owner of a patent to sue a manufacturer, a seller or a user of the patented device or composition; and much, if not all of the evils, harrassments and annoyances of the dental profession would disappear if the dentists were exempt, as users and producers, from suits or claims upon patents, where they are users by purchase of the article, or users of articles which they themselves make, in connection with and in aid of the practice of their profession.

Such a law, we believe, would be construed by the courts so broadly as to permit a dentist not only to use and to manufacture for use those appliances or compositions which he deems essential to the most successful practice of his profession, and the alleviation of pain or suffering to his patient, but would permit him to select some third party to make the particular device or composition which he desired to use, and not compel him to the actual personal manual production of the same.

Book Reviews.

COMPEND OF DENTAL PATHOLOGY AND THERAPEUTICS. By Henry H. Burchard, M.D., D.D.S. Special Lecturer upon Dental Pathology and Therapeutics, Philadelphia Dental College. Publishers: The S. S. White Dental Mfg. Co., 1896.

This little book, evidently prepared originally for the students of the Philadelphia Dental College, is presented to the public with a view to aid students in general. As a rule, it may be stated that the value of a quiz book is questionable. There is always afforded to the mediocre student an opportunity to cram a condensed mass of statements which, too frequently, are memorized in a parrot-like form. If any work can be made an exception to this objection, it is this book of Dr. Burchard's. No higher praise can be given than to say that it is up to date from the first to the last page. It is a systematic, succinct and scholarly production. To the real student its value is unquestioned, even though it may become a temptation to those whose sole efforts are concentrated in obtaining their degree with the least amount of study. It has, however, another field of usefulness which should not be overlooked. Every teacher in a dental school will find this little volume of inestimable value, and this alone warrants its publication.—*Items of Interest.*

* * *

A PRACTICAL TREATISE ON ARTIFICIAL CROWN AND BRIDGE WORK. By George Evans. Lecturer on Crown and Bridge Work in the Baltimore College of Dental Surgery, Etc., Etc., Etc. Fifth edition, revised, with 625 illustrations. Philadelphia: The S. S. White Dental Manufacturing Co., 1896.

It is a work of supererogation to say anything commendatory of "Evans' Crown and Bridge Work." The fact that in eight years five editions have been called for is testimony sufficient as to its popularity. Although a kind of oral jewelry craze has seized upon dentists, and everyone, competent and incompetent, educated and uneducated, trained and untrained, has alike been busy in cutting away good natural teeth for the purpose of putting in crowns and bridges, too often inserted in defiance of all natural laws and upon roots in the worst pathological condition, and although there has been a wild demand for any kind of instruction upon the subject, no rival to this book has yet appeared. It is sufficient, and there is no demand for anything further. The present edition has been carefully revised, and all the new methods are explained and illustrated. It has been condensed in some places and amplified in others, and the whole arranged harmoniously, forming a complete system of instruction.—*Dental Practitioner and Advertiser.*

Notices.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

Dr. R. G. Richter and Dr. W. H. Carson, both of Milwaukee, have been elected respectively president and secretary of the Wisconsin State Board of Dental Examiners. All communications should be sent to Dr. W. H. Carson, Sec'y, 128 Wisconsin street, Milwaukee.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The members of the state board recently appointed by the Governor met at Springfield June 11, 1897, for the purpose of organization. Dr. W. C. Jocelyn, of Cairo, was elected president, and Dr. J. H. Smyser, of Chicago, secretary. The next regular meeting will be held in September at Springfield.

J. H. SMYSER, Sec'y.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

This body will meet at Hygeia Hotel, Old Point Comfort, Va., Friday, July 30, 1897, at 10 a. m. The executive committee will meet at 9 a. m. Thursday, July 29; persons having business with this committee will please present their papers at the first session.

JONATHAN TAFT, Chairman Ex. Com.
B. HOLLY SMITH, Sec'y.

DENTAL DEPARTMENT, WESTERN RESERVE UNIVERSITY.

The annual commencement of the Western Reserve University Dental College occurred May 17, 1897, at Association Hall, Cleveland, O. Livingston Taylor, D.D., delivered an address entitled "Home Thrusts." President Charles F. Thwing, D.D., conferred the degrees upon thirty-one graduates. There were eighty-six in attendance, an increase of 62 per cent in numbers over last year.

SOUTHERN DENTAL ASSOCIATION.

The Southern Dental Association will hold its twenty-eighth annual meeting at Old Point Comfort, Va., August 3-6, 1897. Headquarters at the Hygeia Hotel. A fine program is being prepared and all members are urgently requested to be present, more especially as the next meeting will doubtless be one of the most important in the history of the Association, since the question of consolidation with the American will be settled.

S. W. FOSTER, Recording Secretary.

WISCONSIN STATE DENTAL SOCIETY.

The twenty-seventh annual meeting of this society will be held in the Senate Chambers at Madison, Wis., July 20-22, 1897.

The State Board of Dental Examiners will meet at the same time and place for the purpose of examining candidates for license to practice dentistry.

The Monona Lake Assembly will be held during the same time, thus securing reduced rates of one-fare-and-a-third on all roads.

W. H. CARSON, Sec'y, 128 Wisconsin St., Milwaukee.

NEW JERSEY STATE DENTAL SOCIETY.

The twenty-seventh annual meeting will be held in the Grand Atlantic Hotel, Atlantic City, commencing on Wednesday morning, July 21, 1897, and continue in session two days. Seventeen papers by eminent men will be read upon interesting topics pertaining to the profession. Clinics of every description have been provided; four large rooms on the ground floor available for exhibits, with a 110-volt current for electrical exhibits. Hotel rates, $2.50 per day up. Accommodations for seven hundred guests.

Friends from the West and East contemplating attending the American Dental Association will be able to attend this meeting and take the Old Dominion line of steamers from New York, Thursday July 29, at 3 p. m., at an excursion rate of $11.20; or the Pennsylvania railroad, rate of one and one-third fare.

CHARLES A. MEEKER, D.D.S., Secretary,
29 Fulton street, Newark, N. J.

LIST OF LATEST DENTAL PATENTS.

582,731. Frank Fourt, Fairfield, Iowa. Dental Articulator.
582,796. Charles J. Peterson, Dubuque, Iowa. Dental Mandrel.
582,872. Eugen Muller, Waedensweil, Switzerland. Apparatus for Forming Gold Crowns for Teeth.
583,307. Isaac B. Kleinert, New York City. Dental Rubber.
583,472. Henry Heath, Jr., Brooklyn, N. Y. Dental Disk Mandrel.
583,565. Cassius M. Carr, Los Angeles, Cal. Dental Bridgework.
583,625. Comegys C. and J. Lusby, Philadelphia, Pa. Dental Handpiece.
583,735. Carroll W. Dodge, Worcester, Mass. Dental Polishing Disk.
583,848. Robert A. Dunlap, Carrollton, Ohio. Dental Impression Cup.
584,345. Abraham L. and B. F. Gilmer, Quincy, Ill. Artificial Denture.

PACIFIC COAST DENTAL CONGRESS.

The time for the meeting of this congress has been changed from August 17 to July 13, 1897 (continuing four days), so as to give delegates from the East and elsewhere a chance to take advantage of the extremely low rates of fare offered to the Christian Endeavor visitors.

Our congress will meet the week following the Endeavor convention; and as the rates are open to all, and cover a period of several weeks, it will be an excellent opportunity for the profession to visit San Francisco.

As chairman of the invitation committee, I desire to extend a hearty invitation to the members of the dental profession to join us in this meeting, which we hope to make a grand success

W. Z. KING,
Chairman Invitation and Membership Committee, 1001 Valencia street, San Francisco, Cal.

TIME-TABLE OF TRAINS TO OLD POINT COMFORT.

Trains on the Pennsylvania Railroad leave and arrive as follows:

Leave Chicago 10:30 a. m., arrive Baltimore 12:40 p. m., arrive Washington 1:42 p. m.

Leave Chicago 3:00 p. m., arrive Baltimore 6:00 p. m.

Leave Chicago 5:30 p. m., arrive Baltimore 4:15 p. m., arrive Washington 5:32 p. m.

Boats leave Baltimore, via Bay Line, 7:00 p. m., and Washington, via N. & W. D. C. S. S. Co., 7:00 p. m., arriving Old Point Comfort 7:30 a. m.

Leave Chicago 10:30 a. m., arrive Philadelphia 12:50 p. m.

Leave Chicago 3:00 p. m., arrive Philadelphia 5:47 p. m.

Leave Chicago 5:30 p. m., arrive Philadelphia 4:17 p. m.

Leave Philadelphia 11:10 p. m., arrive Old Point Comfort 8:00 a. m.

It will be seen that those taking this route can go by way of Baltimore, Washington, or Philadelphia, as the fare-and-one-third rate can be obtained for any of these points. For further information address, City Passenger Agent, Pennsylvania Railroad, 248 Clark St., Chicago.

RESOLUTIONS IN MEMORY OF DR. FRANK ABBOTT.

At a special meeting of the Alumni Association of the New York College of Dentistry, held April 29, 1897, the following preamble and resolutions were unanimously adopted:

Whereas, in the wisdom of an all-wise Providence the Alumni Association of the New York College of Dentistry is called upon to mourn the loss by death of our late professor and dean, Frank Abbott, M. D.; therefore be it

Resolved, That the death of our late professor and friend calls for an expression of esteem for one whose character was above reproach, whose undeviating justice and loving kindness to all with whom he came in contact leave impressions that cannot be effaced, and whose power for good, both in and outside his profession, was immeasurable. One of the brightest lights of our profession has been snuffed out, but its influence—pure and strong—cannot be extinguished while dentistry lasts.

Resolved, That this preamble and resolutions be placed in full upon the minutes, and that a copy suitably engrossed be presented to his bereaved family, for whom we feel the sincerest sympathy.

Committee { W. D. TENISON, B. C. NASH, M. C. GOTTSCHALDT.

MEMORANDUM.—Professor Frank Abbott, M. D., born Sept. 5, 1836; died April 20, 1897. College of Dentistry, clinical instructor, 1866-8; established infirmary, 1867; superintendent of infirmary, 1867; professor and trustee, 1868; dean, 1869.

News Summary.

FIRE IN A TALL BUILDING.—A fire, started by crossed electric wires, occurred in the office of Dr. Welch, on the ninth floor of the Champlain Bldg., Chicago, June 26, 1897, and caused $500 damage. The firemen had much difficulty in getting the hose up the stairs, and finally put out the fire with chemical extinguishers.

TO INSULATE ELECTRODES.—First make a solution of shellac in alcohol, having the consistency of glycerin. Spread this over the electrode, leaving

about one-quarter inch of the point uncovered, and drive off the alcohol over a bunsen without burning. The shellac will fuse and leave a hard glossy coating.—*Dental Record.*

INTERESTING CASE OF MEMBRANOUS STOMATITIS.—The patient, a man aged about 20, had been sent to the hospital, suffering from supposed diphtheria. The membrane was not symmetrical, but was confined entirely to the left side of the mouth, covering the hinder portion of the left border of the tongue, the gum around the lower molar teeth, and the tonsil. The case being unusual, careful bacteriological examinations were made, but in no instance was the Klebs-Loeffler bacillus found. After the patient had been in hospital one or two days it was discovered that he had an abscess in connection with one of his lower molars. The offending tooth was removed, and from that time the membrane began to clear up, and soon disappeared. —*Mr. Stanley Colyer, in Jour. Brit. Dent. Assn.*

WISDOM TOOTH AND CRIME.—Darwin has told us that the absence of the wisdom tooth is a sign of civilization, but according to the *Dental Practitioner* Dr. Mario Carrara, of Turin, assistant to Professor Lombroso, has studied the development of the third molar tooth in the criminal, and, in the report made to the Royal Academy of Turin, comes to the conclusion that absence of the wisdom tooth is also a characteristic of the criminal. According to Carrara, in the normal man the third molar is found oftener than in the criminal. He also reports the result of his studies made on sixty-seven craniums of criminals which belong to the Lombroso collection, and he says that 31.3 per cent of them have no third molars. If we thought that wrongdoing would prevent our wisdom teeth from erupting we think it would be an incentive to crime among some of us.

HYDROCYANIC ACID AN ANTIDOTE TO CHLOROFORM.—Mr. Frederick Hobday, of London, having observed that the respiratory center was usually paralyzed first when death occurred during chloroform anesthesia, thought that hydrocyanic acid might prove of service as an antidote where the breathing was becoming shallow and weak, on account of the rapid and powerful temporary exciting effect this drug exerts on the respiratory center. He administered hydrocyanic acid successfully in thirty-one cases of chloroform poisoning in animals, mostly dogs, though some were cats, and the list includes also one calf, one sheep and one horse; the cases were those in which during anesthesia the breathing either stopped suddenly or became gradually slower. The hydrocyanic acid was administered in some cases hypodermically, in others was placed on the tongue. The good result was generally manifest in a very short time—half a minute to two or three minutes —the respirations being resumed and becoming strong and regular. In some of the cases, owing to the dose of hydrocyanic acid being rather large, the breathing became labored, when the administration of chloroform was resumed, so that a balance could be kept up between the toxic effects of the two drugs. These observations lead to the conclusion that hydrocyanic acid is of value as an antidote to chloroform, its beneficial effects being due to its property (when given in certain doses) of rapidly and violently stimulating and exciting temporarily the respiratory and cardiac centers, and so counteracting the depressant and paralyzing effects. The drug should be placed on the back of the tongue or injected hypodermically. In all his cases Scheele's acid was used, and he prefers it to the B. P. acid on account of its greater strength and consequent rapidity of action. For animals he considers one minim of Scheele's acid for every seven or eight pounds of body weight to be a fair amount. It is well not to be too anxious to administer a second dose till perfectly sure the first has been futile.—*Medical Chronicle.*

"Fellowship" Broaches

D. P. S. CO.'S
Improved Pulp Canal Cleansers.

We are pleased to announce to the profession that after a long and careful series of experiments we can now offer them the "Fellowship"

THE BEST BROACH MADE.

This broach is superior to the "Donaldson," for the reason that the blades on the latter are arranged spirally, thereby necessarily producing a corkscrew or gimlet movement in their withdrawal from the canal, and thus lessening their entangling power. Furthermore, the blades are so close together, being on four sides, that they cut the pulp to pieces in extracting it.

Our broach is barbed equally on three sides only, and the blades are cut at right angles to the broach, so that they remove the entire pulp easily and perfectly. This arrangement of the blades is not only the best for removing debris from, but also for scraping and enlarging the sides of, the pulp-canal.

Made of tough steel piano-wire, spring tempered. Put up in four styles: Fine, Medium, Coarse, and Assorted.

One dollar is not much, but it is something to save on each dozen broaches you buy. We sell our broaches for

$1.50 per Doz.

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HYPODERMATIC TABLETS FOR

Local Anaesthesia,

DENTAL.

Formula of N. L. HOFF, D.D.S.

Our Hypodermatic Tablet No. 81, "Local Anæsthetic (Dental)," is made, as stated above, after the formula of Dr. Hoff, and we beg to quote from his paper upon the subject, published in the *Ohio Dental Journal*, as follows.

"The combination I am now using as a local obtundent yields good results. I use sterilized water to make the solution, and, to prevent possible decomposition, make daily or as needed for use. The formula I use is as follows:

℞ Cocaine.....gr. 1-2
Sulphate of Morphine.....gr. 1-8
Sulphate of Atropine.....gr. 1-200
Sterilized water.....gtts. xxx
Mix and inject hypoder. gtts. v to xv.

"For convenience I have had the Cocaine, Morphine and Atropine made into soluble tablets by Parke, Davis & Co., of Detroit, and in this way solutions of any strength desired may be quickly and accurately made with little or no inconvenience. As a solvent I use distilled water containing from 8 to 10 per cent. Euthymol to keep it sterile. If desired to make a 2-per-cent. solution all that is necessary is to dissolve one tablet in 25 minims of water; a 1-per-cent. solution can be made by dissolving one tablet in twice this quantity of water, or 50 minims. A 4-per-cent. solution can be made either by reducing the water one-half or adding another tablet to the 25 minims, etc."

IN TUBES OF 25, 45 CENTS PER TUBE; OR FOUR TUBES (100 TABLETS), $1.65; OR, IN BOTTLES OF 100 TABLETS, $1.55 PER BOTTLE; BUT THESE TABLETS PARTICULARLY, BEING MADE VERY FRIABLE IN ORDER TO BE QUICKLY SOLUBLE, ARE BEST KEPT IN TUBES OF 25.

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